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MR. A. F. D'OENCH, the Superintendent of Buildings for the City of New York, very kindly corrects our statement that notwithstanding the law restricting the height of dwelling houses to eighty feet, such structures were now built there of greater height, and informs us that since the passage of the law no permits have been issued from the Bureau of Inspection of Buildings for any structures exceeding the legal limit of height. We will not attempt to excuse ourselves for making the statement, which was based on the statement made by one of the daily papers, usually well-informed, but we are, of course, glad to be corrected.

A FEW days ago, just after a heavy fall of snow, the roof of the Highland Skating-Rink, in Boston, fell in. It is said that a large party, of four hundred or more, would have occupied the building in the evening, but it fortunately collapsed before their arrival, and no one was seriously injured. Singularly enough, the roof was quite similar in form to that of the market-house at Lancaster, Pennsylvania, which gave way on Christmas eve some two years ago, from the weight of snow on it, but the Boston roof seems to have been rather simpler, and not so good, if any structure can be called good which is unable to support a December snow-fall. In both examples the trusses formed circular arcs, tied with iron rods, but in the Lancaster roof, if we recollect rightly, the tie-rod held the feet of the rafter, and supported struts of some kind, while the Boston roofs consisted only of a laminated rib of plank, tied at a point some distance above the springing by a rod which was simply kept from sagging by a light rod suspended from the top of the truss, and there seems to have been no strutting or wind-bracing of any kind. As shown by the appearance of the ruins, the effect of the snow-load was to distort the rib, flattening it on one side of the centre, and bulging it out on the other. This distortion brought at once a severe tensile strain on the tie-rods and cross-strains on the rafters, and it is probable, judging from the ruins, that in some trusses the tie-rods failed first, and in others the rafters, while some of the trusses, which contrived to spread in spite of their tie-rods, slipped at one end off the walls, and collapsed with the rest. The loss to the owner of the building is said to be fifty thousand dollars, on which there is of course no insurance. For the honor of the profession, we are glad to say that no architect's name is mentioned as having been concerned in the design of the truss, and the owner seems likely to have to bear alone the credit of furnishing another example of the danger of constructing buildings without regard to the ordinary rules of stability and strength.

THE attempt of the New York Board of Aldermen to injure the New York Steam Company, by compelling it to reduce the pressure in its mains to fifty pounds, has been interfered with by the veto of the Mayor, who, in his message on the subject, expresses doubts as to the dangers from malaria excited by the pipes, which some of the gentlemen of the Board thought so serious, and points out, what was evident before, that the enforcement of the resolution "would seriously affect the capacity of the company in supplying customers." The large majority in favor of the measure at its first consideration seems to show that the Board could pass it over the Mayor's veto if it were so inclined, but it is probable that it will hardly venture to do so. In fact, as the demands of politics have already been satisfied by showing the unemployed engineers and firemen and their friends how devoted the Aldermen are to their interests, it would obviously be prudent now to exhibit, for the benefit of those voters who depend in some way on the New York Steam Company, a praiseworthy care in listening with attention to the Mayor's arguments in their behalf.

WE have from time to time in the French newspapers details of the work for the Paris Exhibition of 1889, which are quite interesting. According to the plan now decided upon, the main part of the exhibition will be contained in three separate buildings, occupying three sides of the rectangular Champ de Mars, while the fourth side, toward the river, will be open except for the thousand-foot Eiffel tower, which is to stand in the middle. The two buildings on the longer sides of the parallelogram are to be devoted to the general purposes of the exhibition, while the building on the third side, which will stand directly in front of the Ecole Militaire, is to be reserved for machinery. This structure, according to the plan, measures twelve hundred and fifty feet in length, by about three hundred and seventy-five in breadth, and it is intended to cover it with a roof in a single span, one hundred and forty-five feet high, which will be, we think, the largest single-span roof yet built, although smaller roofs have been constructed of greater span, as, for instance, the roof of the rotunda at the Vienna Exhibition. As to the Eiffel tower, there seems to be now some doubt whether the residents of the neighborhood will permit the construction of an object, which, to say the least, will not add to their comfort, except as a curiosity of construction. Neither engineers nor architects seem to have taken great satisfaction in the prospect of seeing this huge structure overlooking the city, and the adoption of the scheme is said to have been due to the zeal of some of the members of the municipal government. Now, however, a considerable number of the rich and influential people who have houses near by have entered a formal protest against the erection of any permanent structure of the kind, and it would not be surprising, or particularly to be regretted, if the Commission should, even at this late day, give up the plan, and arrange to have the visitors to the exhibition take their bird's-eye view of the city from a captive balloon, or some other inexpensive and temporary affair.

A CURIOUS piece of engineering has just been carried out in Stockholm. The old city, which was built on an island at the outlet of Lake Melar, has long been given up to official residences, and to the kinds of business which officialism collects about itself, and the well-to-do citizens have removed their habitations to the suburban districts on the shores of the lake. The district on the north shore, under the name of Norrmalm, was first settled, and has become the business quarter of the town, while the southern shore, which is very steep and broken, has only within a few years, through the filling up of the other suburbs, been invaded by a rapidly-increasing population, which has built up there the town of Södermalm. So long as Södermalm consisted simply of a row of houses on the lake shore, there was no difficulty in providing quick and easy communication between it and the other portions of the city by means of ferry-boats, but people with a taste for fresh air and an extensive prospect soon took possession of the plateau of Mosebacka, a hundred feet above the water-front, and reached from it by a very steep slope, the inclination averaging one in five. If any one will try walking

up a hill of this pitch, and a hundred feet high, he will find that the inhabitants of the Mosebacka plateau needed pretty muscular legs, and, although zigzag roads of practicable grade were soon made, they were long and tiresome, and as the population increased it became more and more necessary to provide better and easier communication between the high land and the lake shore. For such purposes it is very common in foreign cities to use rope railways, but the Swedish engineers seem to have more confidence in the nerves of the public than those of France or Switzerland, and the first solution of the problem which occurred to them was to place elevators by the shore, extending nearly or quite to the height of the plateau, and connected with it by long horizontal bridges. If all these could be kept enclosed, there might be nothing particularly disagreeable about the transit; but in practice the elevator runs its course of nearly a hundred feet in an open framework, at the top of which its passengers are launched upon a long, open trestle-work, over which they must find their way to their houses on the heights. One would think that in stormy weather this light construction, secured to the ground only at one end and at the foot, would vibrate rather frightfully, even if the passengers were not blown entirely off it, but so far no accidents have happened.

PERHAPS the public proved not quite so bold as the engineers expected, for in the second elevator, which has just been completed, the hoistway is enclosed in a large building, which contains also a *café*, reading-room, and several other apartments for the entertainment of those who wish to rest on their way home. In both cases the elevators themselves are do .ble, with cars of wood, each carried by two wire ropes, and furnished with what we consider an old-fashioned safety-catch for passenger-elevators, consisting of ratchets, thrown out by a spring attached to the rope and engaging in teeth secured to the guides, after the method still used here for freight elevators. The cars are about six and one-half feet by seven, and are considered large enough to carry twelve persons, but the rule is to take only nine at a time. The machinery of the first elevators came from the United States, but that of the second pair was made in Sweden. The principle is simply that of an ordinary hydraulic elevator, fed from a closed tank beside it, into which air is forced, in the way very common among us, so as to keep the water under a pressure of about sixty pounds to the square inch. According to *Le Génie Civil*, the first set of elevators, which has been in service something more than a year, has proved very successful, transporting in twelve months nearly two million persons, and earning a large return on the capital invested.

WITH the present year the editorial management of *Building* passes out of the hands of Mr. William Paul Gerhard, whose professional engagements no longer permit him to devote the necessary time to editorial labors, into those of Mr. William T. Comstock, the publisher, who conducted it so successfully until Mr. Gerhard undertook the work at the beginning of this year. While we hope and believe that under Mr. Comstock's efficient management *Building* will lose nothing of its excellent qualities, we must express our regret at losing Mr. Gerhard from the field of professional journalism. We were sure, when he was put in charge of it, that the technical character and tone of the paper would be of the best, but we were hardly prepared to find him so familiar with the ways and thoughts of architects as his editorial work showed him to be, and the readers of *Building* will always feel, while they rejoice in their friend's growing fame as a sanitary engineer, that they may depend upon his appreciation of their feeling, and his sympathy with a profession to which he has been of no small service.

ACCORDING to the daily papers, no industry is more prolific in brilliant inventions than that of iron manufacture, and hardly a week passes without the announcement of some startling innovation in that art, which, after securing a column's notice in half a dozen journals, falls into oblivion, to be succeeded by another, equally astonishing and equally short-lived. The last of the devices to which our admiring attention has been directed is known as the "sand-core" process, and so far as we can gather from the Boston *Herald*, which is not remarkable for the accuracy of its scientific descriptions, consists in "improving" the manufacture of steel rails, shafting and other products, by making them out of sand, covered with a coating of metal. The sand seems to be got into the steel or iron by putting it in a can, which is placed in the middle of the usual bundle or fagot of bars, heating, and rolling out the whole together, in such a way as to keep the sand in the middle and the iron outside. We are inclined to think that most people will be surprised to hear that this combination, particularly when used for rails, possesses "great stiffness, making a seventy-pound rail fully equal to one of one hundred pounds made solid." This singular effect of stuffing rails with sand is even surpassed by the benefits which the same sort of filling confers upon "line" shafting, in which forty per cent, or, as we suppose is meant, two-fifths the bulk of the shafting, can be made of sand, with the effect of adding greatly to the stiffness and strength of the shafting, and, it is needless to say, of cheapening it materially. We commend this statement particularly to scientific mechanical engineers. If taking out two-fifths of the substance of a piece of shafting, and filling the hole with sand, adds materially to its strength, it would seem as if it would gain still more by replacing a larger portion of the metal with "silica," so that a length of stove-pipe filled with gravel would be just the thing for the principal shaft of a large machine-shop. Worse than this, we are told that these metallic sausages answer admirably for car-axles, so that, while we can trust engineers to draw their own conclusions as to the new kind of shafting, there seems to be no security that some railway manager may not equip his passenger-cars with such cheap imitations of good, sound iron, to the great danger of the public.

WE are far from making as much use of permanent pavements as other nations, but the fashion of solid and durable building is spreading among us, and some of our readers may be glad hereafter to remember a clever device, which, according to *La Semaine des Constructeurs*, has been recently introduced for forming handsome and desirable waterproof floors at a small expense. The usual way of making such a floor with us is to lay iron beams, with brick or terra-cotta arches between, and put a thick bed of concrete over the arches, laying the tiles on the concrete whenever it is dry. This makes a heavy and costly floor; and water falling on the tiles may in time work its way down into the concrete and masonry beneath, causing dampness and stains. The new system, invented by M. Gresly, does away with all the brickwork, terra-cotta and concrete, employing only large tiles of earthenware or artificial stone, of proper surface on top for walking on, and modelled underneath so as to form a rich ceiling, which are laid on light iron beams of V-section, such as are known in Europe as Zorès beams. The open side of the beams is laid uppermost, so that the hollow forms a gutter, exactly like the gutter of a stable, by which any water that may come through the joints of the tiles over them is conducted to a safe outfall. The cross joints of the tiles, which have no V-beam under them, are efficiently protected from leakage by being formed with a section like that of the frame of some casement windows, so that one edge of each tile hooks over into a groove formed on the edge of the next, and water that may come through runs along the groove until it reaches the ends, where it drops into the V-iron, and is carried away. Nothing could be simpler than the whole affair. The inventor claims, and apparently with reason, that if a quantity of water amounting to three feet in depth per hour should fall on the pavement, it would be immediately carried off, without the possibility of any drip into the room below; and as there is no bedding of the tiles to be done, and even the joints need not be cemented, the laying, both of the V-beams and of the floor, is very cheap. According to our experience, tiles of this kind would be better in artificial stone than in vitrified clay. As there is no danger of shrinking or warping in artificial stone, they could be made in that material of more perfect shape, and closer fit, than would be practicable with clay; while clay, even without the difficulties attendant upon its irregular contraction, could not easily be made into pieces of the size and weight desirable for giving the most solid floor, with the greatest economy of iron. Where it is desirable to admit light through the pavement, M. Gresly uses tiles of cast glass, and even for flat roofs the same construction might be used, with the addition of a covering of felt and asphalt, if necessary.

EGYPTIAN ARCHITECTURAL POTTERY.

"WESTWARD the course of empire wends its way," and in order to trace the history of art, we must commence at the west and backward follow its course to the east, and thence to the north-eastern extremity of Africa, where we find in those lone monuments of other days in the "Black Land" the earliest and most marvellous examples of man's constructive ability resting upon a portion of the ancient delta of the Nile. Any statement, however, must stand upon a hypothetical basis which seeks to fix this point as the initiative one from which emanated that impulse which resulted in the greatest mechanical constructiveness ever known in the history of the human family. Our knowledge of Chaldea is yet very imperfect, and it is possible that as that country becomes more thoroughly explored, architectural remains may be discovered of an earlier date than those now known to exist upon the banks of the Nile. The buildings of Mesopotamia were not so well constructed as were those of Egypt, where for a long period the royal tomb was the chief object of the king's reign, and it is possible that it is owing to the indestructible manner in which the Egyptian monuments were erected that Egypt retains the palm of historical priority. The adobes or sun-dried bricks employed for constructive purposes in Mesopotamia did not possess the capacity to impart permanency to architectural works of any character, nor to offer great resistance to their obliteration through the ever-changing courses of the Euphrates and Tigris.

The ancient history of the art of pottery manufacture therefore forms a subject of great intent; for even from pre-historic periods of human existence known to us only by the tangible memorials of primitive inhabitants, this art appears to have been practised. In primitive times those who followed the plastic art produced only rude adobes, and afterward vessels of coarse clay, which were sun-dried or imperfectly baked, and which latter at a later period were occasionally ornamented with concentric and transverse scratches; from this lowly origin the potter's craft, after centuries of gradual development, finally culminated in the building of the massive pyramids, and after another lapse in those exquisite fictile forms and decorations of the Greeks, and then ebbing and flowing with the tide of European civilization, until as products of the art we find the almost unequalled ceramic achievements of to-day. The art of pottery was well developed in Egypt long prior to the time when Central Asia first offered material proof of civilization. If we reckon the pyramids of Abousere and Dashour as of the third dynasty, which, according to Lepsius, extended from 3338 to 3124 B. C., it will be readily seen that many centuries elapsed before the palaces of Nimroud were erected, and even Babylon cannot claim an age more remote. The primitive art of making adobe bricks was easily learned, and some of the earliest sun-dried bricks produced were doubtless used in the building of the various brick pyramids.

In Egypt the station of every man for life was fixed by caste; the individual could not make his own way and fortune in the world, but must follow the accident of birth, and if his father was a potter, he must be one also. The caste system was the chief agent in the decline of Egypt; it was a bar to progress, and discouraged all attempts at improvement; it crushed out personal ambition, the result being dull uniformity. Thus it happened that these people were satisfied to plod out their aimless lives completing those works which their ancestors had commenced, making not the least effort for the development of individual ideas; generation upon generation followed each other for a period of a thousand years and then failed to bequeath to posterity any indication of increased personal ability. It is thought that the business of brick-making was a royal monopoly in Egypt, as a very large number of bricks are found in that country impressed with the cartouche of its princes. Were it not for these ovals bearing the hieroglyphic characters used for the name of Egyptian rulers, it would be almost an impossibility to even approximately separate the dynasties.

The mud of the Nile is the only material in Egypt suitable for brick-making. The modern plan is the same as the old; a bed is made, into which are thrown large quantities of cut-straw, mud and water, and this is tramped into pugs, removed in lumps, and shaped in moulds or by the hand. The moulded clay is then sun-dried, not burned, the bricks of Egypt, both ancient and modern, being adobes.

Egyptian bricks vary in dimensions from 1 foot 8 inches to 1 foot 3 inches long, and are in thickness from 8½ inches to 4½ inches, and weigh about 16 lbs. The largest are those of the earliest dynasties before the sixth, and they become of smaller dimensions under the eighteenth and following dynasties. At the earlier period rude marks, spirals, curves or devices, made by pressing the finger or fingers of the hand into the moist clay, were impressed on the bricks; but from the time of the eighteenth until the twenty-second dynasty (1600 to 900 B. C.) stamps were introduced of an oval or square shape, having in relief the prænomen or name of the monarch, or the names and titles of the persons for whose buildings or constructions they were made. In the Egyptian room of the British Museum, among the Egyptian antiquities, there are bricks from the pyramids of Howara, Dashour and Illahoon, and others with the prænomens of Thothmes III and IV, B. C. 1600; Amenophis III, about 1500 B. C.; and Rameses II, about 1332 B. C. Rameses II is the Sesostris of the Greeks and the "Pharaoh the Oppressor" of the Israelites; he was the grandson of Rameses I, whose son was Seti I, and whose great-grandson Menephtah is the Pharaoh of the Exodus. The narratives of the classical writers have immortalized the military glory of Sesostris, but his achievements, as well as those of his father, Seti I, as patrons of architecture, are less well known.

At Thebes their creations were stupendous, and an inscription in the temple at Karnak states that Seti I had planned a canal to connect the Nile with the Red Sea, and at the same time to irrigate the plains of Southern Goshen. Bricks stamped with the name of the Pharaohs of the Exodus have been found at Tanis, the Ramases of the Bible, and at Pithom, where the Scriptures tell us that "the Egyptians made the children of Israel to serve with rigor, and they made their lives bitter with hard bondage, in mortar and in brick and in all manner of service in the field." (Exodus, i: 13, 14.) In Exodus, v: 7, we find that the task-masters and their officers were commanded, "Ye shall no more give the people straw to make brick, as heretofore; let them go and gather straw for themselves."

Recent excavations have been made on the site of the Pithom, the treasure-city built by King Rameses II, with the bondage labor of the children of Israel. The buildings proved to have consisted almost entirely of tremendous storehouses, built of adobes; some of these sun-dried bricks were made with straw for binding, and some without it.

We have seen in the Berlin Museum an adobe brick mixed with straw, brought from Goshen. It bears the stamp of Rameses II, who frequently made his headquarters at Tanis, from whence he started on his warlike expeditions, and there he signed a treaty which terminated one of his greatest wars, which was with the princes of the Keeta. Rameses II was continually at war with the Semitic nations, and he consequently severely oppressed the kindred race, who were subject to him, and strove to burden them with hard labor. Paintings in the tombs at Thebes depict the laborers engaged at their tasks of making bricks; but the people there represented carrying water in large pots to temper the clay, digging up the earth, kneading the clay, carrying the clay to the moulder who dashes it into wooden boxes, all under the supervision of the taskmasters who, with stick in hand, watch them, are not the Hebrews but Asiatics of some other race whom Thothmes III had brought captive into Egypt at an earlier date, and there compelled, as the inscription informs us, "to make brick for the new buildings of the provision houses or granaries of the City of Amon." The Holy Scriptures early familiarize us with the Pharaohs, the Nile, and the beautiful narratives of the adventures of the infant Moses and of the virtuous and prudent Joseph; but they make no mention of the pyramids of the land of the Nile, nor do the Scriptures mention the other monuments of human labor which abound in Egypt, and which, seemingly built to last for eternity, appear to be exempt from the common law of the obliteration of all things earthly. But these prodigious results of human constructiveness, which the Greeks called "the wonders of the world," have nevertheless been known to all of us from our earliest days.

The next step in the development of the potter's art in Egypt, after the production of adobe bricks, was the manufacture of the coarse, dull earthenware probably made from the same kind of clay of which the adobes were moulded. Vases of different kinds of pottery were used by the Egyptians for domestic and other purposes. Earthenware vases were in use at the earliest period in Egypt, and some in the collections of Egyptian antiquities come from tombs in the neighborhood of the great pyramid erected under the fourth dynasty. The Egyptian vases are distinguished by their shape, which is not so elegant and refined as the Greek, and for the thickness of the substance of which they are made. They were either unglazed, polished or painted, and when painted, the colors were laid on in tempera. Some vases have the names of the possessors inscribed on them, and a few were imitations of those in more costly material. They were made on the potter's wheel, and were rarely stamped out from the moulds. For stoppers they appear to have had lumps of unbaked clay, tied over with linen cloth by a cord passed round the neck. Various objects were deposited in the vases, such as edibles, bread, fruits, liquids, drugs, oils, wine, water, salt and salted food, and occasionally papyri, beads, figures, and the like.

The Egyptians, if not the inventors of making glass, were great workers in that substance, and early learned the method of applying a vitreous coating to pottery, and even to stone. In the glass collection of the British Museum, there is a very remarkable amulet with the prænomen of Huantef IV, a monarch of the eleventh dynasty, placed by Lepsius between 2380 and 2223, B. C.

It is difficult to fix the date when the so-called "porcelain" came into use in Egypt; its employment was certainly as old as the eighteenth dynasty, when the beautiful blue color due to the employment of copper was introduced. During a visit to the British Museum a few months since, the writer noticed a glazed steatite vase[1] from Thebes inscribed with the titles of Thothmes I, about 1633, B. C., thus showing an acquaintance with glazes more than 3500 years ago.

The manufacture of glazed tiles in Egypt, has also an earlier origin than is generally supposed. The British Museum[2] contains tiles of this character from the site of Tel-El-Yahoudeh, or "Jew's Mound," the supposed *Vicus Judæorum*, or Oneias. In using this mound as manure for the adjacent lands, numerous fragments of glazed tiles and porcelain were discovered, many bearing the names and titles of Rameses III, 1200, B. C.

At the period of the twenty-sixth dynasty, a pale apple-green colored ware came into use, and continued till the time of the Greek and Roman rule, when jugs in the shape of the *oinochoe*, or wine-bottles, ornamented with figures in relief were fabricated, and bore incised inscriptions with the name of the reigning monarch.

The ancient Egyptians did not possess the art of painting as it is known to us to-day; the six colors which they mostly employed, red, yellow, blue, green, black and white, were applied for decorative purposes without regard to the truth of the object which they attempted to depict, and the degree to which they conventionalized all natural objects in their picture-writing made truth, sympathy, and faithfulness in delineations and colorings completely secondary to decorative laws. The glazing, enamelling, glass-works, and, in fact, all the arts of Egypt, reached their greatest development under Alexander and the Ptolemies (332 to 30 B. C.); and during the Roman Dominion they produced very elaborate specimens, especially minute mosaic patterns, of which there are good examples. These were made by arranging in the required patterns a number of slender rods of glass, of various colors, fusing them together, and then drawing them out, so as to uniformly reduce the whole; transverse sections of the rod thus obtained would each exhibit the same pattern. The manufacture of glass was probably introduced at Rome by Egyptian workmen; the material was applied to a great many uses, and the processes seem to have been quite as varied and well understood as in later times. The common glass has usually a bluish or greenish hue, although it is not infrequently as white and brilliant as rock crystal; and it was highly prized by the Romans; different shades of yellow, blue, green and purple, form the other usual transparent colors. The employment of gold is thought to be the means by which the delicate and beautiful pink color which is so much admired was imparted. It is not often that the opaque colors are employed singly, but when used they occur in shades of yellow, blue, green and black. Occasionally a colored ground was covered with white opaque glass, which was afterwards cut away, thus producing a cameo. The celebrated glass vase deposited in the British Museum by its owner, the Duke of Portland, and hence popularly known as the Portland Vase, is an instance of the last-named method of ornamentation. This vase was found in a marble sarcophagus in the Monte del Grano, near Rome, and was formerly in the Barberini Palace. The ground of this vase is of blue glass, the design is cut in a layer of opaque white glass, the composition is supposed to represent, on its obverse the meeting of Peleus and Thetis on Mount Pelion, and on the reverse Thetis, in the presence of Poseidon and Eros, consenting to be the bride of Peleus; a bust of Attys is represented on the detached bottom of the vase.

In other instances, a number of different colors were employed sometimes, as in the Egyptian specimens above noticed, forming regular mosaic designs, sometimes blended into a mass of scrolls, rosettes, etc., and at other times imitating agate, madrepore marble, onyx, porphyries and other hard stones, though generally in more brilliant colors. The mosaic glass, and especially that imitating various stones was often employed to line the walls, or to form the pavements of rooms.

The beautiful blue color which, as has been previously stated, was applied to the so-called Egyptian "porcelain," was due to the presence of a double silicate of copper and sodium, and one of the earliest uses of this glaze for architectural purposes was for the decoration of the jambs of an inner door of the Pyramid of Saqqara. These tiles were probably made expressly for the position which they occupied in the decoration of the doorway, and this statement is corroborated by the presence of numerals in hieratic characters on the backs of the tiles. These tiles are about one inch in width, and are twice as long as they are broad, and the exterior surface is slightly convex; other tiles, however, are rectangular, and in order to more easily fit into the plaster they are bevelled inward, and are almost black in color; but probably the greatest use of tiles of this character is to be found in the ruins of the Tel-El-Yahoudeh, the supposed *Vicus Judæorum*, or Oneias, to which reference has previously been made. "The walls of this edifice were revetted with porcelain tiles containing the legends and conquests of the monarch Rameses III. Some of the tiles consisted of long rectangular slips with the hieroglyphs incused and inlaid with pastes or colored glass fitted into the incused portions. The background of these tiles were generally blue. Some square tiles have a yellow background with the hieroglyphic name and titles of the monarchs inlaid in colored paste, producing a varied and lively effect. Another class of tiles representing Asiatic and negro prisoners conquered by the same king are of an entirely novel character and resemble modern Palissy ware. The figures of the prisoners are in relief on a flat rectangular ground; portions of the garments and the backgrounds are inlaid with colored pastes of various hues, the features and flesh of the limbs are appropriately glazed, and the hair or head-dress — especially of the negroes — of colored pastes. They are well-made, and are fine specimens of toreutic work in relief."

We have previously stated that numerous fragments of glazed porcelain were discovered with the tiles in moving the mound on the site of Tel-El-Yahoudeh; there were also found portions of alabaster, and other calcareous stone in the shape of heads and arms of inlaid figures. Like the acrolithic statues of Greece the early ones of Egypt appear to have been not infrequently composed of different materials, such as ivory and ebony, or wood and porcelain. Porcelain was employed for inlaying coffins and other sepulchral purposes; but it was also used for ornamenting domestic articles, as is shown by a box from a sepulchre at Thebes, and which box is now on exhibition in the British Museum. It is of a very dark-colored wood, and has a square border composed of rectangular tesseræ of blue porcelain, alternating with tesseræ of red-colored ivory; this border is on the side, and also on the cover of the box. There are also in the British Museum two remarkable objects intended for inlaying; the first is a tile of blue porcelain, measuring about six inches by four inches, traced upon which in a darker blue color is a figure of a royal scribe depicted in the act of worshipping Osiris; the second is of a circular form and traced upon it is the representation of a spider in the centre of its web.

Here we shall leave the potteries of Egypt; although this people possessed many technical processes of great value, and their textiles have never been equalled; and yet having an abundance of all necessary materials they cannot justly claim other than a low position in ceramic art, so far as they made efforts for the production of true porcelain, or brilliant and lasting enamels.

Charles T. Davis.

[1] No. 4762. Second Egyptian Room.
[2] Case D. First Egyptian Room.

THE ORIGIN AND SUBSEQUENT GROWTH OF ORNAMENTAL ART.[3]

It seems to me that ornament on wares had its origin not merely in an attempt to escape from the wearisomeness of labor, but rather in an expression of pleasure, in the hope and sense of power and usefulness which men in the making of things felt in the childhood of the world. That pleasure of labor did not fail man for many ages. That which makes Gothic art — by which term is indicated the work of the Middle Ages — what it is, is its freedom. It was above all things the art of the people — the art of coöperation. No craftsman who is a real one is despised in it. There is room for every mind and every hand that belongs to a real man; something to express, and some means of expressing it are all that is asked for. All the time this art lasts no handicraft lacks beauty for a moment, nor is any one set to dull and slavish toil. Things grow beautiful under the workman's hands, without effort it would seem, and men do not know how to make an ugly thing. Nowadays, when we light on a piece of the household gods of this period we pay vast sums of money for it and treasure it up in a museum, for it teaches us — us who know everything else — this rough piece of handiwork, done by an artisan who thought that the world was like a flat dish, and that the sun went round the rim of it. If this seems strange to you, let me remind you of one kind of work wrought by these craftsmen which are both more accessible and more impressive than their moveable household goods. I mean some of the buildings which our forefathers lived in, and among which it is your rare good fortune to live — a good fortune which I hope will leave its impress in many an hour of sweet indestructible pleasure on the future lives of every one of you. Centuries we cannot count lie between the day when the cave-dweller scratched his drawing of a mammoth on a mammoth's bone, and the day when the English masons and wood-carvers struck the last stroke before the reformation on the work at, say, St. George's Chapel, Windsor. During all those ages, whenever we

[3] From a lecture by William Morris, delivered at Manchester on Sunday, September 26, and published in the *British Architect*.

catch a glimpse of the life of the people we find the popular arts progressive on the whole, and seldom failing in their first aim of lightening the toil of man by giving him pleasure in his daily work. A long lapse of years indeed, while from the time when Sir Thomas More wrote his eloquent attack on commercialism and land-grabbing till now, the days are few, the time short.

But what has happened to popular art in that short while? What has happened to the popular arts, I say, in those three hundred years of struggle, mostly successful, for religious and political liberty, in those centuries of miraculous progress, during which England has grown from a semi-barbarous island-kingdom into a mighty empire, the master of the minds of men as well as of their bodies? I can tell you in three words what has happened to those arts; they have disappeared. That is a strange story indeed; and you may well doubt its truth, the change is so tremendous. But my whole position is this, to have popular art, or the art of the people, it must be made by and for the people, which means, as I have said, that man's handiwork is universally beautiful to the eye and elevating to the mind. But such art as pretends to be popular nowadays, do the hands and minds of the people fashion it? Do the people use it? Are the people rejoiced with the making and the using of it? So far is this from being the case that the people do not even know that such an art exists or ever has existed. What pretence there is of decorative art is little touched by the people's hands, and not at all by their minds. They work at it not knowing what they do. Like all other toilers nowadays, their work is a grievous burden to them, which they would cast off if they could. We cannot help knowing that not another hour's work would be done on the decorative arts to-day if it were not that the workers feared death by starvation if they left their work. I hope you do not suppose that on these terms of labor you can have an art which has any life in it. If you do you are dreaming, and will have rude awakening some day.

The existing gulf between rich and poor, which is in fact a gulf between civilized and uncivilized people living in the same state and under laws nominally the same — this is the gulf which has swallowed up the popular arts; the art which raised our ancient buildings here and elsewhere, and under which every man's intelligence, were it great or small, was used and subordinated at once for the creation of a great work of art, whereas now it is accepted as a fact that whatever intelligence one of the non-gentlemen class may possess is not, and cannot be exercised during his working hours. In order to win that privilege, he must raise himself out of his own class and become a gentleman. The essence or soul of popular art is the due and worthy delight of each worker in his own handiwork — a delight which he feels he can communicate to other people, as it has been communicated to him by the thoughts of many generations of men under the name of tradition. If any of you care about art in any form, I am sure you will allow that this reciprocal pleasure of communication is always present at the birth of a work of art. When you have been listening, for instance, to a beautiful piece of music, could you possibly suppose that it was an irksome task to invent the sounds which were filling your whole soul with satisfaction, or, when you have been reading some beautiful passage of poetry, could you suppose that the strong and melodious words which were elevating your soul and opening new worlds to you had been given forth from the writer's brain in a dull and pleasureless mood? Surely it is impossible that it should be so.

Yet remember, the artist's, the musician's, the poet's work is not easy; it is real labor enough unless he is a pretender. There are traps and pitfalls on the right hand and on the left into which his hope of creating a work of art may fall, and against which even the best man has to be laboriously on his guard. I say he is a workman or no artist, and on these grounds I claim some share of the divine pleasure of creation which accompanies it for all handicraftsmen, believing firmly that the making good of this claim is a necessity for the world, if civilization is to be anything else than a name. For, first, unless this claim is allowed and acted on, unless it is insisted on as a necessary part of the organization of society, it must be the rule that all things made by man for the use of his daily life will be ugly and base, will show wherever they are placed as mere blots on the beautiful face of the world. And secondly, it will surely be but right and just that they should be ugly and base, for so done they will be but tokens of the enduring sorrow and slavery of the great mass of mankind; for all people not dishonest must work, and in one way or other their working hours must be the most important part of their lives. If, therefore, they have due hope, pleasure and honor in their daily work, their lives will, on the whole, be happy: if they lack that hope, pleasure and honor, their lives will be unhappy. It would, therefore, be unjust that art should come from the unhappy lives of the most of men, or in other words that the great mass of people should toil miserably for the pleasure of a few dishonest people. Fortunately you see, as far as the arts go, that cannot be; it is a question of art and the happiness of the worker, or lack of art and his unhappiness.

For these days, then, in which man has obtained so much domination over the forces of nature, in which so much of what passes for wealth is produced, in which society taken as a whole either is or could be so rich — in these days what are the conditions of life for the working classes — that is to say, for most men — which would produce beauty and happiness for the world?

(1) No honest or industrious man must be under fear of poverty. The sordid troubles which this fear produces destroy imagination and intelligence, or turn them into other channels than the hope of giving pleasure to the world. Every man, therefore, must be certain of earning a due livelihood, by which word I understand all things necessary for his mind as well as his body.

(2) All men must have due leisure — rest for body and mind, time for following according to their bent other occupations than the mere bread-winning one, even if it be pleasant: and if their bread-winning work is of such a rough nature as of necessity to lack art or expression of pleasure in it, the daily hours of such labor must be very short.

(3) It follows from this last remark that all work in which art or pleasure is impossible should be done without as far as may be — that it should be looked on as a nuisance to be abated, a sickness of society. As far as possible it should be done by machines, and machines should never be used for doing work in which men can take pleasure; whereas at present, as we all know too well, men do the work of machines and machines of men — both disastrously.

(4) Those who are to produce beauty must live amidst beauty; their homes and surroundings must be clean, orderly, and in a word beautiful. This should be no hard matter to accomplish, since the whole is beautiful save where man has made it ugly.

(5) All men should be educated, and have their due share in the stored-up knowledge of the world, so vastly greater now than in the days of art, but so much more unequally shared. All men, I say, should be educated, not down to their "station in life," as people call it — that is, according to the amount of money their parents may have — but according to their capacity.

(6) When all these claims are allowed and acted on, the last claim I make for labor will come of itself — that is, that there should be an end of class distinctions, that is to say, that all crafts should be honorable and honored, and that every man should be able to rise to eminence and fame by the exercise of his own craft, the work he understands best; whereas at present he can only rise to eminence by deserting his craft, by taking an undue share of the wealth of the world as wages for doing lighter work than his fellows, by becoming a capitalist, as the phrase goes.

To my mind these are the conditions of life for working men, or really for all men, under which we can have in these days once more popular art, or a happy life for most men. Is it worth while to strive to bring about this happy life? If it be, can we say that the price to be paid for it can be too high, whatever it may be? You will have understood, if you have followed my statement of the due conditions of labor, that in my belief that price is the reconstruction of society, for no mere palliatives of the evils of the present system will bring about those conditions. Furthermore, I admit that such a great change would involve the sacrifice from many of us of things now much cherished; yet, as I believe that those who uphold the present conditions of labor on the grounds of self-interest do so rather from stupidity than malice, so I think that their loss, or punishment if you will, will be rather imaginary than real when the change comes. I think what we shall chiefly have to sacrifice will be the incumbrances, the troubles, the sorrows even, which we now cherish as part of our wealth. As to the means by which the reconstruction is to be brought about, I must, for more than one reason, say nothing of them to-day save this, that you yourselves in one way or other will, as time goes on, have offered to you opportunities of helping forward or of hindering that reconstruction. I believe the time is at hand when each one of us of the well-to-do and rich classes will have to choose whether he will strive to have the great mass of men his equals and friends, or to keep them down as his slaves. When that time comes may we all remember this, that wretched and shameful as is the condition of a slave, there is one condition more wretched and shameful still — that of slaveholder.

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE ROTCH TRAVELLING SCHOLARSHIP DRAWINGS. — PLATES XXXIV, XXXV, XXXVI.

[Issued only with the Imperial edition.]

COUNTRY PLACE AT MERION, PA., NEAR PHILADELPHIA, FOR GEORGE L. CRAWFORD, ESQ. MR. B. LINFOOT, ARCHITECT, PHILADELPHIA, PA.

DESIGN FOR A CITY HOUSE. MR. J. N. TILTON, ARCHITECT, CHICAGO, ILL.

TOWN-HALL, TÜBINGEN, WÜRTEMBERG. SKETCHED BY MR. F, THORNTON MACAULAY.

CONVENT OF THE HOUSE OF THE GOOD SHEPHERD, TROY, N. Y. MR. T. O'GRADY, JR., ARCHITECT, BOSTON, MASS.

THE TREATMENT OF SEWAGE.[1]—VI.

PLACES WHERE LIME HAS BEEN OR IS BEING USED.

HERTFORD.—Population about 7,000. Lime was employed from 1858 to 1875, at a cost of £410 per year.

Alton (*Hampshire*). — Population 4,192. (Chloride of iron also used on hot days.)

Balsall Heath (*Worcestershire*). — Population 14,000. Filtration through gravel. Effluent discharged into Birmingham and Warwick Canal.

Blackburn (*Lancashire*).—Population 83,000. Lime used as an auxiliary to irrigation.

Birkdale. — Population 8,705. Cost, £1,000 per annum (= 5d. rate). Sewage treated 650,000 gallons daily. Lime used per year, 208 tons.

Birmingham. — Adopted in 1873 on the recommendation of Mr. Hawksley. Lime is added to the sewage at a distance of one-third of a mile from tanks (13 tons to 12,000,000 gallons). The treated sewage flows into tanks, and the effluent passes into the River Tame. About 400 tons per day of precipitate obtained, which is partially dried and burned. General Scott attempted to make Birmingham sludge into a cement, but not with marked success.

Bromley (*Kent*). — Population 12,000. Filtration through gravel after lime treatment.

Burton-upon-Trent. — Population 20,378. Sewage very foul (about 6,000,000 gallons daily) on account of the brewery refuse, and often of a high temperature. Lime used up to 1883 at the rate of one ton per million gallons. Cost of treatment £2,000 to £2,500 per annum. Irrigation on 460 acres now adopted.

Bradford (*Yorkshire*). — Population 173,000. Eight to eight-and-a-half million gallons daily, containing much manufacturing refuse. The sewage is screened, 300 tons of deposit a year being thus obtained. It is then precipitated with lime (1 ton [? grain] to a gallon), and passed into tanks, where it is allowed a rest of from thirty to forty-five minutes. Effluent discharged into Branford Beck, a tributary of the River Aire. Cost 8d. per head of population. For a short time the sewage was filtered through peat charcoal, by the Peat Engineering and Sewage Filtration Company.

Chester. — Population 35,232. 1,500,000 gallons per diem. Some of the sewage treated with lime, but the most part by irrigation. Effluent discharged into River Dee.

Ealing. — Population 9,959.

Harborne (*Staffordshire*). — Population 5,105. Lime in conjunction with filtration through gravel, coke, and charcoal.

Leicester. — Sewage dealt with partially and inefficaciously.

Luton. — Sewage contains chemicals used in bleaching and dyeing straw plait.

Lime treatment has also been used at Banbury, Coventry, Cheltenham, Halifax, Hitchin, Leamington, Leytonstone, Leeds, Newcastle-under-Lyme, Ormesby, Over Darwen, Oxton, Southboro, Tottenham, West Ham and Worksop.

Lime undoubtedly has its objections, foremost of which are:

1. If the lime be added in a sufficient quantity to produce good results (which it can be) the amount of sludge produced is very large and very valueless, consisting principally of non-nitrogenous organic matter and carbonate of lime.

2. The effluent is strongly alkaline, and, therefore, more or less liable to putrefy.

3. Free lime is injurious to fish life. Hence a lime effluent is liable to destroy the fish in a river, unless it be, previous to discharge, treated with an acid.

LIME AND CHLORIDE OF LIME.

At Hertford, in 1886, about 8¼ bushels of lime and 150 lbs. of chloride of lime were used daily in the treatment of 1,640,000 gallons of sewage per day (= lime 2 grains, chloride of lime 0.64 grains per gallon). At this time the population was 7,000, showing the great quantity of subsoil water that must have mixed with the sewage in its transit to the works (= 234 gallons per head). The lime (as cream of lime) added, was apportioned to the rate of flow by little buckets attached to a water-wheel. The treated sewage was now discharged into a depositing tank. The tanks are in duplicate, each tank being worked three days, where it remained about forty minutes, a period too short for complete subsidence. The tank was divided under the water-line by a cross-wall, the sediment being thus kept back, the supernatent water being then filtered through 6 or 7 inches of coarse gravel and 3 inches of fine sand. The filter required cleansing daily. From the filter-beds it passed into an effluent channel about a mile long, to be discharged into the River Lea at Ware Mill. About 12 cwt. of sludge was removed daily. After flowing along the outfall channel for a quarter of a mile, it became clear, fish and vegetation being found in the water in abundance.

In 1866 the following analyses were obtained:

Date.	Matters in solution.			Matters in suspension.		
	Total solids.	Organic.	Mineral.	Total solids.	Organic.	Mineral.
Raw sewage, Aug. 26	26.95	1.70	22.25	2.45	1.05	1.0
Effluent, "	26.60	1.00	25.60	0.85	0.35	0.5
Raw sewage, Aug. 31	29.30	1 95	27.35	6.30	3.25	3.1
Effluent, "	27.25	1.20	26.05	1.30	0.60	0.7
Raw sewage, Dec. 13	30.33	5.35	24.98	5.39	0.71	4.68
Effluent, "	27.00	2.51	24.49	0.74	0.24	0.50

In 1867, 3.43 grains of lime and 0.33 grains of chloride of lime were used per gallon, and the analysis (November) was as follows:

	Matters in solution.				Matters in suspension.		
	Total solids.	Organic.	Ammonia.	Oxygen to oxidize.	Total.	Organic.	Mineral.
Raw sewage.	25.0	2.50	0.34	.296	1.42	0.72	0.70
Effluent.....	28.33	1.25	0.45	.281	0.43	0.17	0.26

The chloride of lime, although only one-third of a grain per gallon, not only disinfected the sewage, but prevented the growth of the sewage fungus.

My experience enables me to speak favorably of the employment of chloride of lime with lime, especially in hot weather. About 56 lbs. per 1,000,000 gallons will be found, as a rule, fully sufficient for a sewage represented by 30 gallons per head of the population.

LIME AND SULPHATE OF SODA.

Fulda's Process. — This process was tried on a small scale at Pratt's cloth mills (Yeadon, near Leeds), and at Barnsley Union Workhouse in 1873. The process was abandoned, the effluent not proving satisfactory.

SALTS OF MAGNESIUM WITH TAR AND LIME.

Fritz Hillé's Process.—The process of Fritz Hillé (patented 1870) was to be used as follows:— A mixture of lime (100 lbs.), gas-tar (3 lbs.), chemical salts, viz., chloride of magnesium (17 lbs.), were made into a paste with 180 lbs. of water. Hillé, however, does not bind himself to these exact quantities, varying them according to the composition, strength, and quality of the sewage to be treated. From the decomposition of the magnesium chloride by the lime, a bulky precipitate is formed, which carries down the suspended matter.

The exact quantity of paste to be added must also be a matter of experiment. It will vary from ¼ lbs. to 1 lb. per 100 gallons, or from 10,000 lbs. (= 4 tons, 9 cwt., 1 qr., 4 lbs.) to 2,500 lbs. (= 1 ton, 2 cwt., 1 qr., 8 lbs.) per million gallons. This quantity, however, supposes subsequent filtration.

Hillé suggests that the sludge may be advantageously used again as a precipitant for fresh sewage, employing for this purpose a mixture of from two to five parts of sludge with one part of the paste. Further, he considers that depositing tanks are not essential, but that the sewage after treatment may with advantage be applied directly to the land.

If tanks be employed, they should not be used for more than three days at a time. (See paper by Hillé, Society of Arts Conference, 1879, p. 139. See also Hillé's pamphlet on "Sewage Disinfecting, with Analyses by Letheby,") pp. 13 to 15.

The following are places where Hillé's process is or has been employed:—

Edmonton.—Still in use. Population 15,000. Daily sewage 800,000 (domestic and dilute). The materials are added in the proportion of 3 tons, 7 cwt., at a cost of £6 per 1,000,000 gallons (= 1*s.* 2*d.* per head per annum). The sludge formed is stated to be 3 tons daily. There are 114 acres of land used for subsequent irrigation with the effluent.

Tottenham.—(Population 23,000; sewage 1,200,000 gallons daily.) The cost of maintaining the works in 1875 was £1,979.

Windsor, *Aldershot*, *Leicester*, *Grantham* and *Taunton* have also used the Hillé process.

At *Wimbledon*, Surrey, (population 12,500) the process was employed from 1870 to 1876.

SALTS OF ALUMINA.

Numberless patents have been taken out for treating sewage by means of compounds of alumina.

If sulphate of alumina only be used, the ammonia of the sewage would in time effect its decomposition, resulting in the precipitation of alumina. The action of alumina thus set free is to combine with the soluble organic matter, with which it forms an insoluble compound. Thus it is used as a mordant or fixing agent for colors when applied to fabrics, and to precipitate coloring matters from their solutions, forming insoluble compounds called "lakes." Ammonia and phosphoric acids are also fixed by aluminous compounds.

Stothert (1852) patented a mixture of sulphate of alumina (or sulphate of zinc), caustic lime and charcoal (obtained from sewage or night soil) as a precipitant for sewage. The quantities suggested were 73.5 grains respectively of sulphate of alumina and charcoal, 3.5 grains of sulphate of zinc, and 22 grains of slacked lime per gallon. The lime was to be added first, and then the mixture of

[1] A paper by Dr. C. Meymott Tidy, read before the Society of Arts, April 14, 1886, and published in the *Journal* of the Society. Continued from No. 572, page 279.

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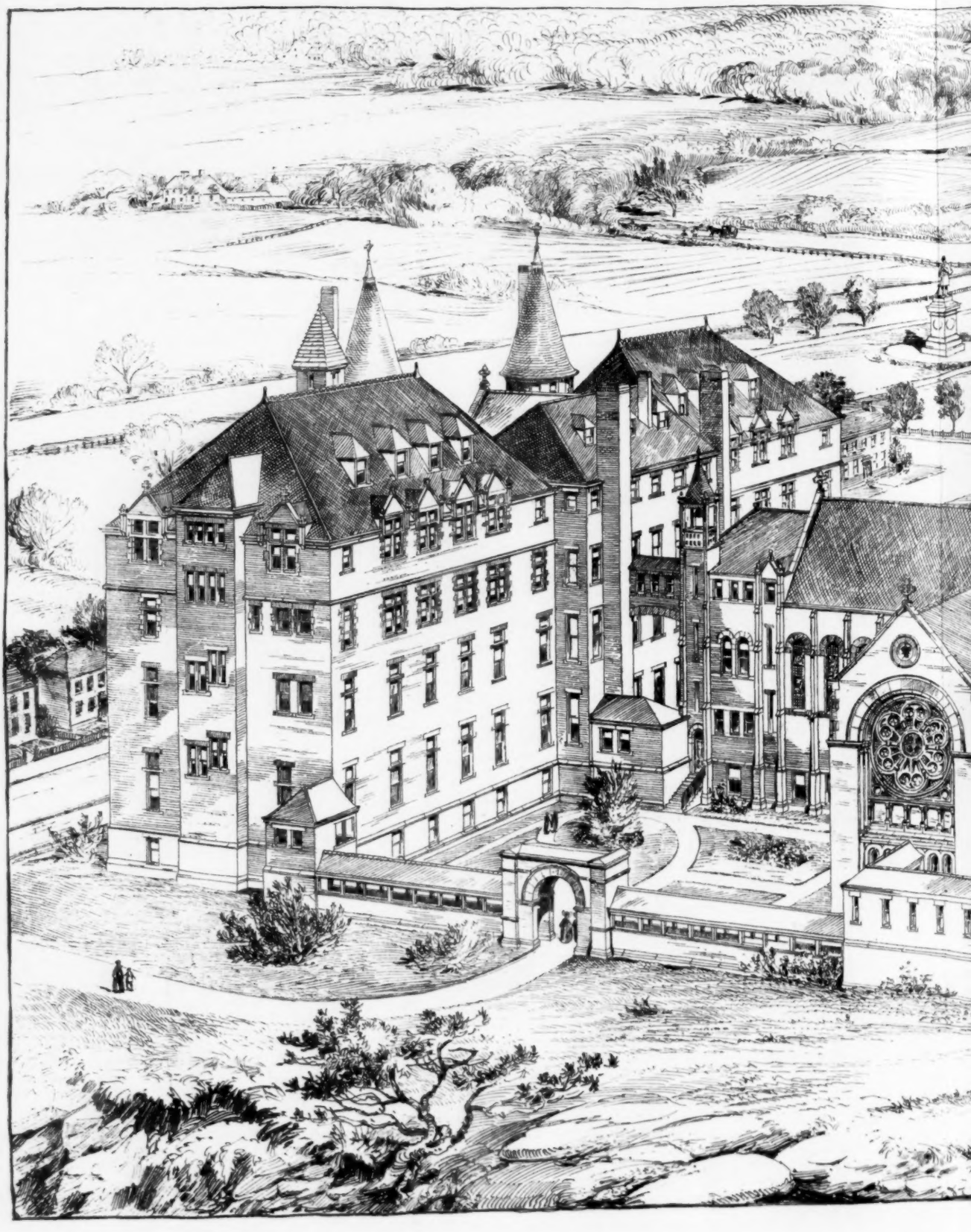

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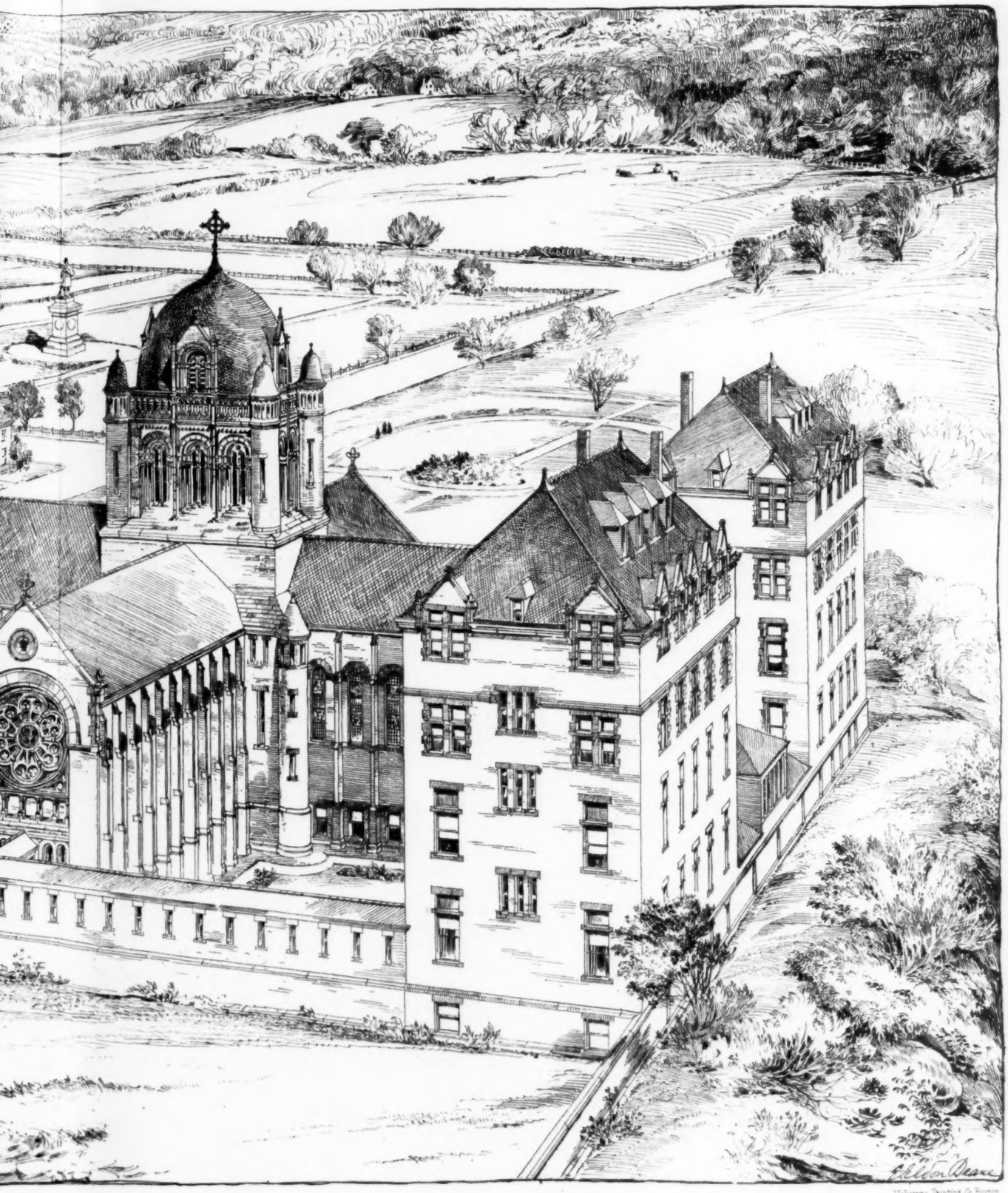

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of the Good Shepherd · Peopler Avenue · Troy · N.Y.

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Entrance Front.

"A Country-Place,"
at Merion, near Philadelphia.

The property of
GEORGE L. CRAWFORD, ESQ^RE.

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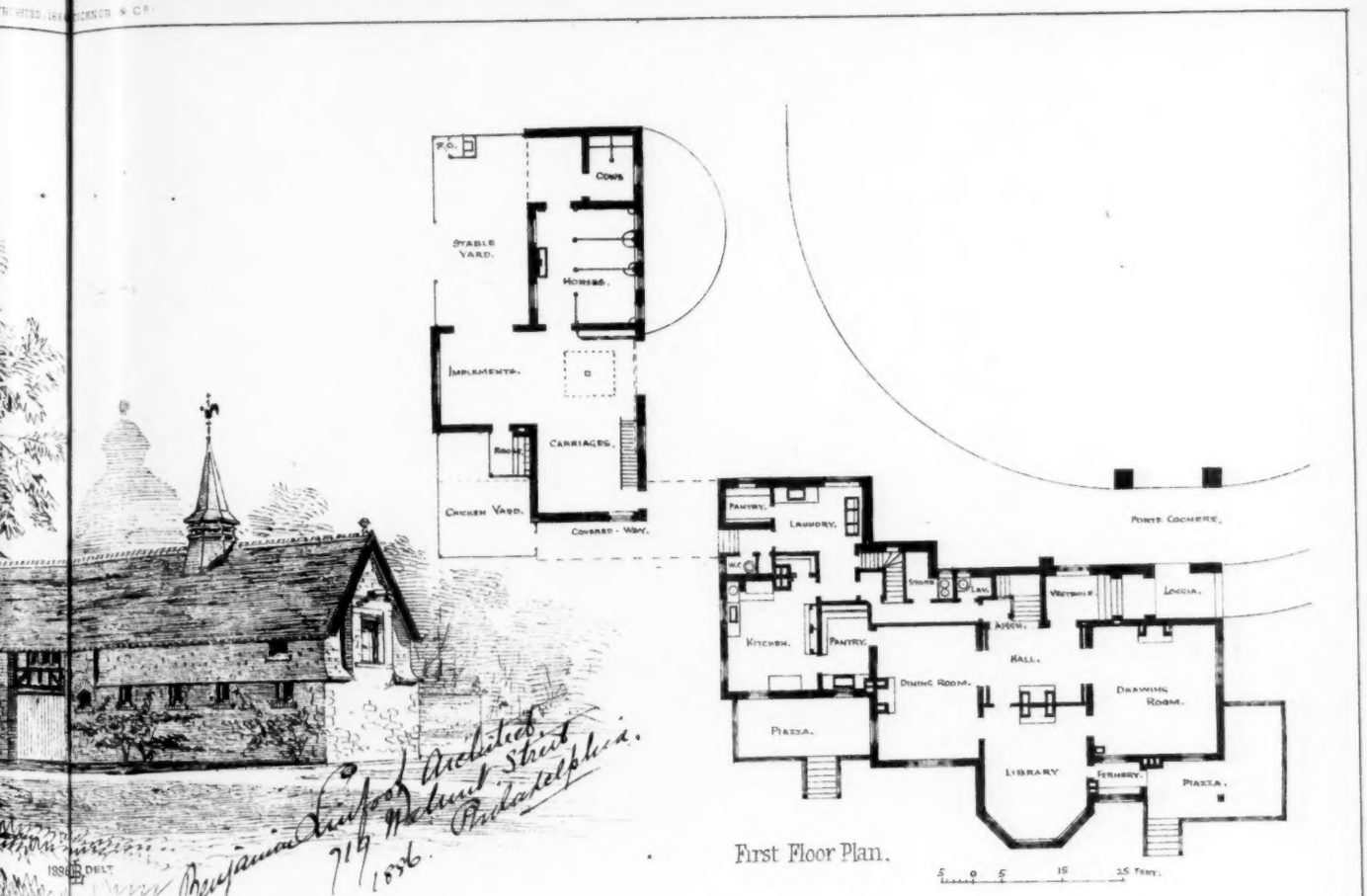

First Floor Plan.

Benjamin Linnard Architect
719 Walnut Street
Philadelphia.
1886.

Garden Front.

Heliotype Printing Co. Boston.

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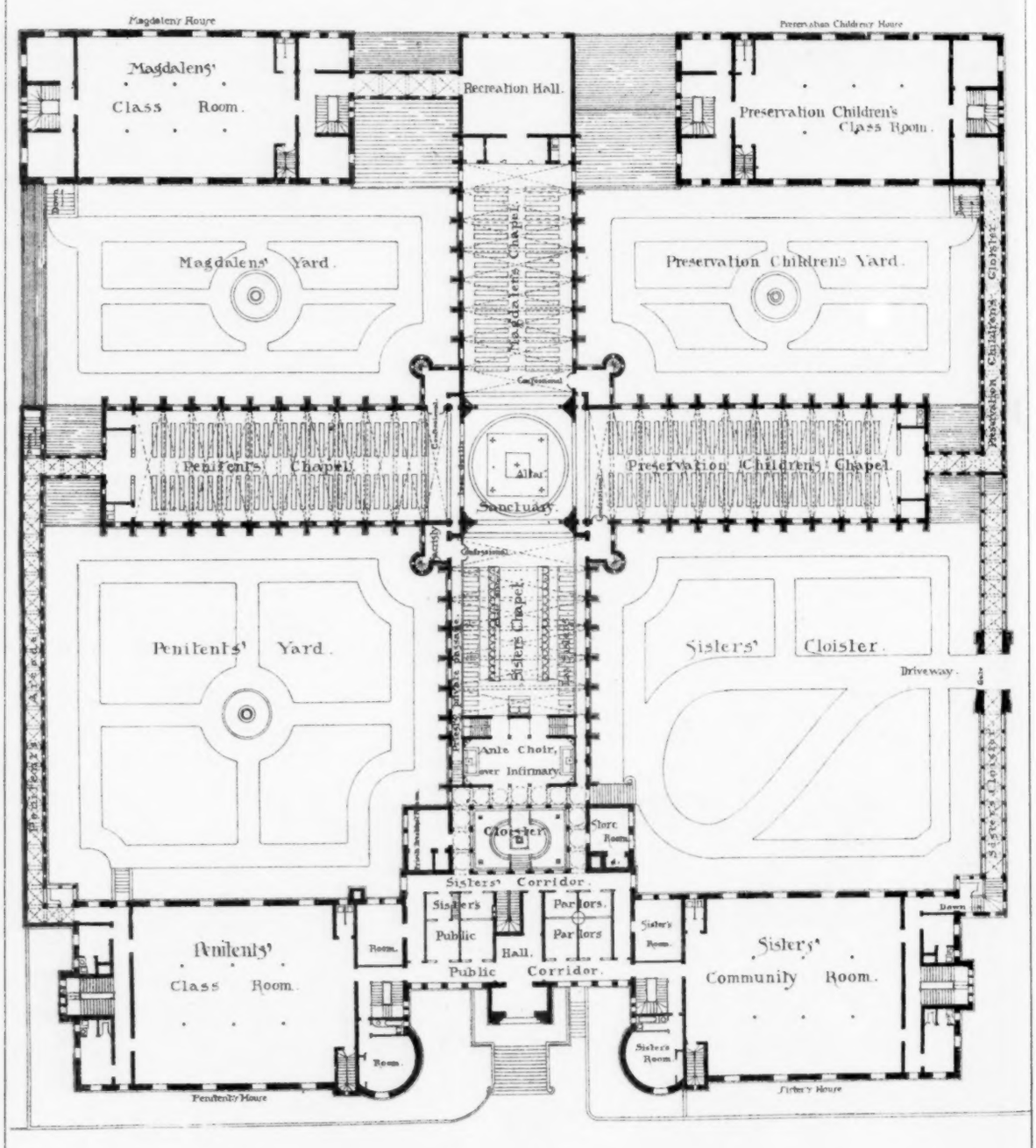

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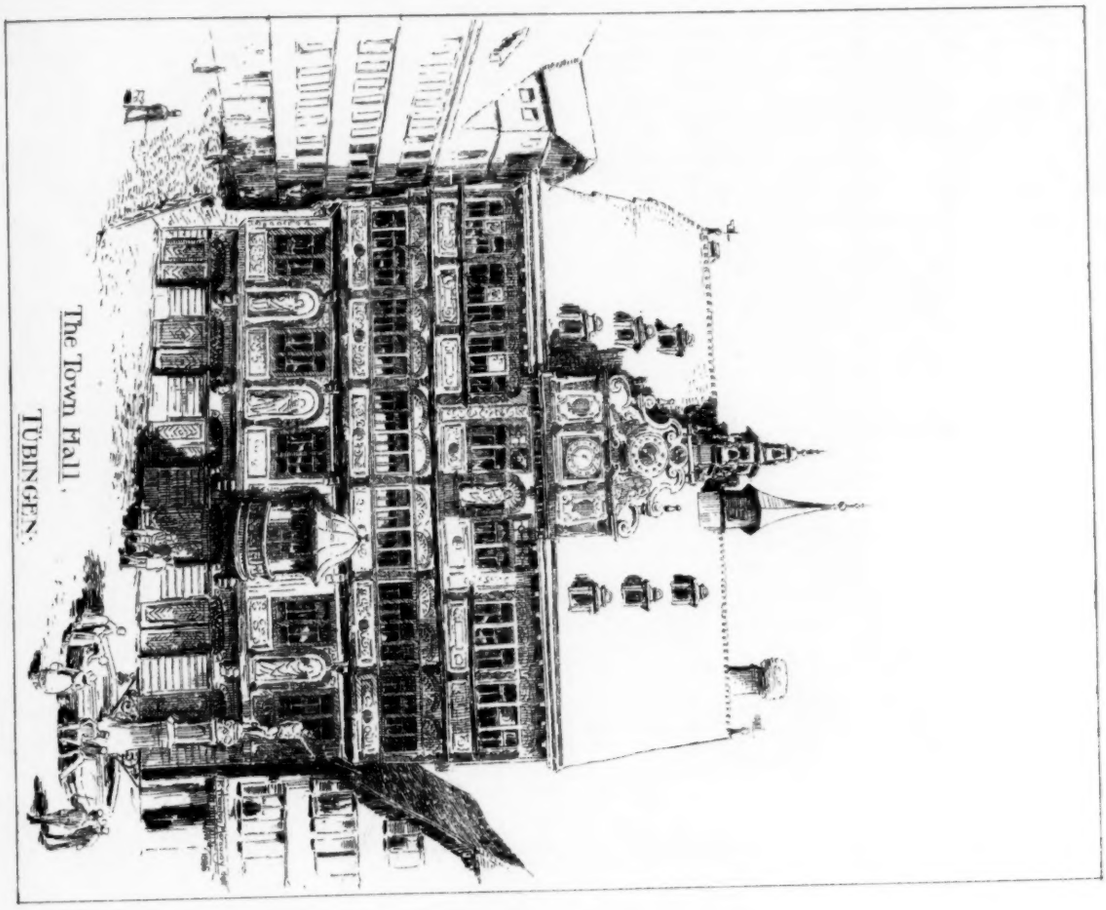
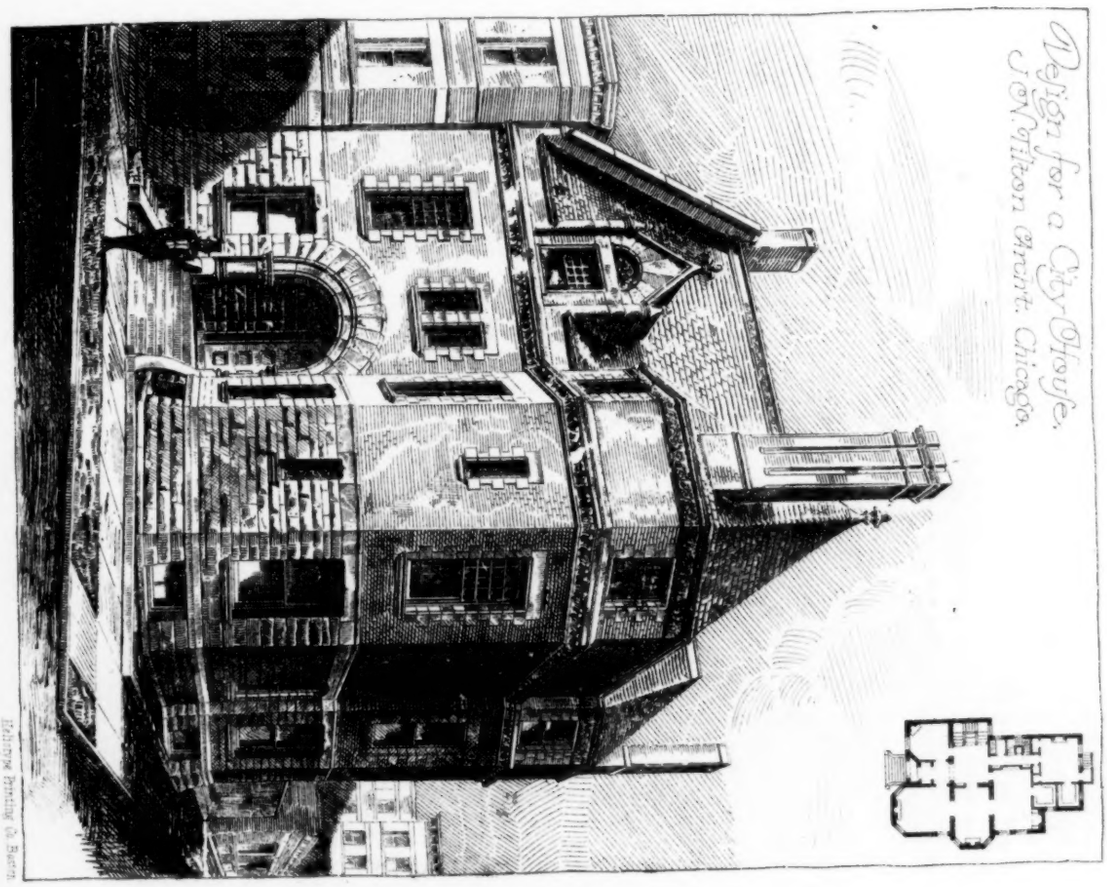


The Town Hall,
TÜBINGEN.



Design for a City House.
J. Nolton Arch't. Chicago.

charcoal with sulphate of alumina. Hoffmann and Witt report (1857) the following results produced with 5 ozs. of lime and 10 ozs. of the alumina mixture to 40 gallons of London sewage: —

	Matters in solution.			Matters in suspension.		
	Total solids.	Organic.	Mineral.	Total solids.	Organic.	Mineral.
Raw sewage.	107.6	52.36	55.24	52.49	36.4	16.09
Effluent.....	87.73	37.56	50.17	none.	—	—

They record that the addition of the alumina caused a marked increase of suspended matter, as well as a largely increased flocculation and rapidity of subsidence.

Stothert claims that a ton of the materials, costing 30*s.*, will make 2 tons of manure, worth £2 2*s.* per ton, containing, when dried, 1.44 per cent of ammonia, 8.6 per cent of phosphate of lime, and 34 per cent of organic matter.

I do not know of this process having been employed on a large scale.

Lenk's deodorizing liquid (patent, 1865) was a solution of alum cake (crude sulphate of alumina), containing 12 per cent of alumina. In the case of London sewage, 25 grains by weight of the solution sufficed to defecate a gallon efficiently, a very flocculent precipitate forming, which required about thirty minutes to subside.

This process was tried in Tottenham in 1858 for about one week, one ton of solution (value £6 10*s.*) being used to treat 4,900,000 gallons (700,000 daily). The following results were obtained: —

	Matters in solution.				Matters in suspension.		
	Total solids.	Ammonia.	Organic.	Phosphoric acid.	Total solids.	Organic.	Mineral.
Raw sewage.	91.10	9.76	42.30	3.77	367.7	225.6	142.1
Effluent.....	63.39	4.23	9.70	trace.	3 01	0.77	2.24

The precipitation was very successful. Voelcker reported that "the effluent might be poured into any watercourse without causing a nuisance." He valued the dry deposit at from 25*s.* to 30*s.* per ton.

A curious history is here presented of a local authority, guardians of the public health, and moreover, under an injunction not to pollute the Lea, trying a process for one week, which they admitted gave "fair results," and which others know to have been more than fair, and then abandoning it, whether from carelessness or parsimony I do not know.

Manning (1853) suggested as a sewage precipitant, a mixture of animal charcoal, alum, carbonate of soda, and gypsum, some caustic lime in addition being also advised. The use of alum, on account of its expense, was afterwards dispensed with (patent, 1854), by the employment of a waste obtained in the course of the alum manufacture from the rough liquors (called soft sludge, consisting of sulphates of iron and alumina), and afterwards (patent, 1855) by the use of various aluminous minerals and earths (alum slate, etc.) treated much in the same way as that adopted in the preparation of alum.

The sewage was to be treated as follows: — The aluminous preparation was to be added to the sewage, and the whole agitated, the unslacked lime with animal charcoal being introduced during the mixing. The treated sewage was then to be allowed to subside in proper tanks.

This process was favorably spoken of by Penny, of Glasgow, who gives the two following analyses of the sludge: —

	Per cent.	Per cent.
Ammonia.....	2.22	0.884
Phosphate of lime.....	2.05	13.57
Organic matter.....	43.72	31.74

The former he regards as of the estimated value of £1 16*s.* 5½*d.*, and the latter of £1 15*s.* per ton.

COMPOUNDS OF IRON AND ALUMINA (SULPHATED CLAY).

Bird's Process.—Six cwt. of powdered clay is treated with 120 lbs. of sulphuric acid, and the mixture allowed to stand for a week.

The following are places where the process has been used: —

Stroud (Gloucestershire). — This solution of sulphate of alumina and iron is used in quantity equal to 28 to 37 grains of mixed sulphates per gallon, at Stroud (population 8,000) in Gloucestershire, to defecate 200,000 gallons of sewage. The treated sewage is allowed to run into settling-tanks passing from one to another through straw filters, and finally filtered through coke filters. The sludge is dried and made into a manure by admixture with sulphate of ammonia and phosphate of lime.

The Stroud sewage was examined and reported on by the Rivers Pollution Commissioners in 1868, when a solution containing 6 cwt. of pulverized clay acted on by 120 lbs. of sulphuric acid was added to 200,000 gallons of sewage. They record the effluent as inodorous, but not of a high degree of purity. (See First Report, 1868, p. 58.)

Cheltenham.—Bird's process was adopted at Cheltenham in 1868. It was said not to be a success.

Northampton. — In 1872, Northampton sewage, which was then 1,000,000 gallons a day, was defecated with crude sulphate of alumina and iron, made by the action of sulphuric acid on a ferruginous clay. Three cwt. of chamber sulphuric acid were added to 2 tons of clay in a wooden trough, and allowed to remain in contact for a week. The solution was generally found to contain about 15 cwt. of a sulphated ferruginous compound. There were six of these troughs in use — the entire soluble contents of one trough being used daily. The flocculation was imperfect from the want of an efficient stirring apparatus. Moreover, the acid of the chemicals caused effervescence with the carbonates present, a scum being formed from the rise of the suspended matters. This, however, was kept back in the first tank by cross-bars. The sewage then flowed into a second tank, and finally over a weir into a channel a mile in length, when it was discharged into the river. The river itself was clean, the aquatic vegetation healthy, and fish abundant.

The samples given below are averages of many samples taken over 24 hours. The effluents generally were clear and inoffensive.

	Matters in solution.			Matters in suspension.		
	Total solids.	Oxygen required to oxidize.	Ammonia.	Total solids.	Organic.	Mineral.
Raw sewage.....	73.60	2.265	4.98	13.83	8.48	5.37
Effluent, 1st tank.	70.16	1.980	4.19	4.97	2.91	2.06
Effluent 2d tank..	70.65	1.243	3.247	1.74	1.11	0.63

About 400 tons of sludge were removed per week. This was mixed with sifted ashes (48 tons) and burnt refuse (20 tons), and found a market at 3*s.* per ton.

In 1875, the proprietors of Bird's process brought an action against the proprietors of the Coventry process for infringement, in which they were unsuccessful.

A process (*Cobley's* patent) similar to the one just described (the precipitants being said to consist of iron, alumina and carbon) is in use at Crewkerne, the precipitant being placed in a box with perforated sides, the sewage being allowed to flow through the box by which contact with the precipitant was secured. There is no stirrer, but sufficient mixing is said to be effected by the means described. The patentee states that the precipitant can be supplied (exclusive of a small royalty) at £2 per ton. A good effluent, which does not undergo putrefactive change by keeping, is stated to be produced.

At Hertford (population 9,000) the sewage is treated with a solution of sulphate of iron (1 part), lime (2 parts), and sulphate of alumina (2½ parts). It flows into subsidence tanks (seven in all, five being used continuously), and finally through a coke filter.

LIME AND SALTS OF ALUMINA (COVENTRY PROCESS).

Anderson, of Coventry, suggested the use of lime and an aluminous compound, prepared by adding 1 part of common sulphuric acid, mixed with its own bulk of water, to 2 parts of clay (shale having also been used). The mixture is to be set aside in a warm place until it appears white on the surface.

One pound of this mixture is to be well agitated with 100 gallons of sewage, and a ¼ lb. of lime (as cream of lime) afterwards added. He advises that the defecated sewage be allowed absolute rest for twenty-four hours, the clear effluent being then drawn off and the sludge removed.

Odling gives the following results by this process: —

	Matters in solution.			Matters in suspension.		
	Total solids.	Organic matter.	Ammonia.	Total solids.	Organic.	Mineral.
Raw s'ge.	42.77	8.83	0.77	89.74	51.66	38.08
Effluent.	56.28	6.30	0.84	1.61	0.91	0.70

Both Odling and Voelcker reported highly of this effluent, as thoroughly deprived of noxious qualities.

The sludge is valued by Voelcker at 30*s.* per ton. He gives the following analyses: —

Moisture.....	12.01	15.70
Organic matter.....	26.89	31.86
Phosphate of lime.....	2.60	2.55
Mineral salts.....	6.61	10.33
Silica, etc.....	51.89	39.56
	100.00	100.00
Ammonia..... =	1.39	1.22

At Coventry the use of this process was commenced in 1874. It has been ably supervised for many years by Mr. Melliss, C. E. There are, at the present time, four precipitating tanks worked on the continuous principle. The effluent flows through filter-beds occupying 9 acres, used intermittently, and is ultimately discharged into the River Sherbourne.

The sewage of Coventry is about 2,000,000 gallons daily, very foul, and much colored with dye refuse, etc. It needs far more chemicals than average sewage. The sludge produced is about 25 tons per day (90 per cent moisture). About 2 tons of crude sulphate of alumina (but of which two-fifths, being insoluble in water, is not put into the sewage), and 10 cwt. of lime are used daily. The cost for chemicals is said to be £1 14*s.* per 1,000,000 gallons, and the entire cost (including rent, capital on works, management, etc.) about £4 14*s.* per 1,000,000 (=1.8½ per head).

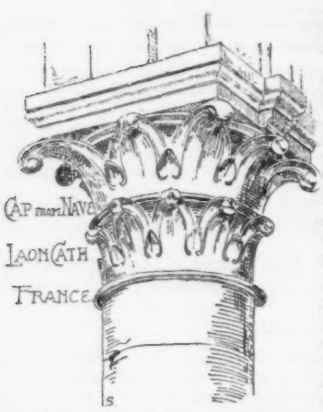
Formerly, one portion of the sludge was got rid of in a semi-dry condition at 7*s.* per ton, whilst another portion, dried and reduced to a portable condition, fetched £2 per ton. Some of the sludge was also "fortified" by added chemicals, and fetched from £5 to £6 per ton.

A similar process was also in use at Nuneaton from 1872 to 1876, when the arrangements between the Local Board and the General Sewage and Manure Company fell through, from some misunderstanding respecting the average daily flow. Nuneaton sewage is offensive, owing to the presence of manufacturing refuse. From

400,000 to 500,000 gallons were treated daily. The effluent was filtered through 2 acres of land. The yield of manure was about 1 ton daily. The cost was as nearly as possible the same as at Coventry.

[To be continued.]

THE LATE PRINCE TORLONIA.



EVERY morning during the last quarter of a century, just as the first streak of dawn broke upon the horizon, as the first bells chimed out the Angelus, the peasants on their way to the markets of the Eternal City, the workmen treading to their daily toil have met a little old man trudging with sprightly steps toward the Church of Our Lady of Loretto, close to Trajan's Forum. He was a peculiar-looking old man, not exactly seedy or shabby, but his garments, although they did not betoken indigence, were such as would be worn by one who evidently meant to get all the wear out of them that was possible. Yet peasant and artisan alike used to bow very lowly to him, and he would return their salutes most courteously, showing that he understood what a good thing it was to be on good terms with everybody. A stranger might have mistaken this personage for the servant of some ecclesiastical community, or perhaps for the overseer of some opulent family, and in the last they would not have been far out of the way, although when that old man died all Rome crowded to his obsequies, and the Libro d'Oro was fully represented around his coffin. The latter was deposited, according to high patrician privilege, upon the altar steps of the Basilica of the SS. Apostoli, where he laid in state robed in that livery of the pauper, the habit of the order of St. Francis, for he to whom were paid these honors of pride that ape humility was not only one of the wealthiest private individuals in Europe, but certainly the most remarkable among all in his acts of benevolence and charity — Prince Alessandro Torlonia, Duke of Musignano, Prince of Civitella-Casi, of Farnese, and of Fucino.

Everybody has heard of the name and the fortune of the Torlonia, the first of whom, Prince Giovanni, Stendhal has treated so cruelly with his pen dipped in gall, satirizing the young-born opulence of one who affected a species of haughty good-fellowship in his intercourse with his contemporaries, as if that affectation of familiarity could excuse his insolence to all who were less noble than he. Of very humble origin are the Torlonia, and only toward the end of the pontificate of Pius VI did the first banker of their family — then called Turlonia — come to be known, by his wealth amassed by contracts with the French armies during the wars of the revolution in Italy. In Stendhal's time the beginnings of those splendors dated back scarcely five and twenty years, where still might be seen at the corner of the Via Condotti and the Corso the little shop which, forty years before, was the unique domain of the millionaire's family.

It was not, then, to be wondered at if this delicate hypercritic did sneer at the parvenu, who, by his luxurious ostentation, eclipsed the most illustrious of the aristocrats, who entitled himself the Marchese di Roma Vecchia, and who told, as he pointed to the mirrors of his palace, how he had bought them for a mere song from a second-hand dealer with whom he passed himself off as the steward of *quel ladro di Torlonia*, of whom he could not say too much in dispraise. But Stendhal might have remembered — he who so passionately loved Italy, and so well knew her history — that the opulence of the patricians of Genoa and of Venice and of the most illustrious of all, the Medici of Florence, had trade for its cradle.

True, at Rome it was not quite the same thing, but the fruitful administration — to use no harsher term — of the property and the favors of the church is hardly more chivalrous and more heroic than commerce, and the Italian aristocracy, which does not share the disdain professed by aristocracies of military origin, is quite indifferent to what so aroused the German poet's imagination. The Florentine nobles still continue to sell by their concierges to the passer-by the produce of their vineyards and olive groves. The Ginori, allied to the Medici in the days of Lorenzo the Magnificent, manufacture porcelain and has no hesitation to fill an order for the least heraldic imaginable of utensils. And the Corsini? They produced a saint in the sixteenth century, as was then the fashion; they produced a Pope in the eighteenth century, as was then the bounden duty of every great family in Italy having a proper sense of its own importance, but, in the nineteenth century, the head of the Corsini is the President of the greatest of Italy's financial companies. The Italian nobility appreciates the rôle that it is set for; it is practical; it has good common sense, and instead of embarrassing its native land by whining over a past which can never be recalled, and privileges which have become extinct, it sets the example by the encouragement of progress. It considers itself as a guest at a banquet, to which any one can be admitted who is willing to pay his scot. And it is for this reason that the death of Prince Alessandro Torlonia, the grandson of the Roman mercer, has put into mourning the Orsini and the Doria, the Chigi, the Barberini, and the Colonna, those historic families which, within the last fifty years, have become, by marriage, the allies of those once humble tradespeople.

I think it was Mme. Sevigné who said that "nothing was so ruinous as the want of money." The converse is certainly true, and nothing enriches so much as wealth, which nobody can deny, as in spite of the proverbial good luck of the Torlonia family, and its unquestionable financial cleverness, an outsider has some difficulty in understanding how it is that the immensity of their outlay, apparently unproductive, should have not at least diked that Pactolus which rolls its golden flood undiminished by their prodigality since the opening of the present century. Palaces and villas filled with sumptuous furniture, museums peopled with statues, obelisks of Alpine granite, a monumental chapel at St. John Lateran, three churches magnificently restored, the two principal theatres of Rome rebuilt, immense archæological excavations, one of which uncovered an ancient circus, until then buried for ages; royal fêtes given in honor of the Roman aristocracy and of princely travellers; banquets at which plebeian guests sat down by thousands; charitable foundations too numerous to mention; all these are expenses, seemingly without other end in view than ostentation, which look like wasteful profusion, and yet to meet them it has sufficed that two successive generations should have produced in the same family two men endowed with intelligence of no common order, each of whom passed ten hours of every day of his life seated at his desk, pen in hand, absorbed in calculation.

Yet as success in every line is the lot of nobody, the Torlonia, fathers and sons alike, have always failed to realize that ambition which, next to the acquisition of wealth, has ever been their fondest dream. They hankered after the glory of the Medici; they aspired to immortality as the protectors and patrons of high art in the nineteenth century, and they have not succeeded. Everything due to the magnificence of the Torlonia lacks the element of good taste, and wherever appears their escutcheon bearing the two comets which a satirical herald gave to them as appropriate arms, never believing that their constellation could become one of the fixed stars — whenever anything emanating from their munificence appears, the passer-by, if he be of a refined turn of mind, would do well to look another way. Take, for instance, the Villa Torlonia, or the Via Nomentana, their most personal creation. It is the abomination of desolation predicted by the prophet. It is a union of the false Greek with the false Gothic. You go from one apocryphal coliseum to fancy ruins and thence to a grotto where pasteboard stalactites are encircled with tin ivy leaves. There, too, you are asked to admire the famous obelisks of Baveno, which bear on their pink granite the name of Torlonia, translated by a Jesuit into the sacred characters of Rhamses-Meïamoun. And the Olympus where stand whole regiments of statues! Words are wanting to express the contempt inspired by all this *lusso infelice*, as the Italians qualify a futile attempt to obtain that picturesque decorative effect which was the last quality of the artists of the eighteenth century that remained to the Seven-hilled City. Nothing can be imagined less artistic, more strained, more grotesque, and the only excuse to be offered is that the Torlonia were obliged to address themselves to their contemporaries. Sigismondo Chigi, the Torlonia of his age, was more lucky, when, to save his name from oblivion, he secured the aid of Bramonti and of Raphael.

It is probable that Prince Alessandro understood that this satisfaction of his *amour propre* was unattainable, for in the latter years of his life he abandoned the administration of his bank, ceased to build and to entertain, neglected the superintendence of the tobacco monopoly which he had managed for many years, and devoted himself wholly to that colossal enterprise which would have frightened the boldest speculator and which the Government even hesitated to undertake — the drying up of the Colano Lake, called in antiquity the Fucino.

The Emperor Claudius, a great administrator and an indefatigable worker for the public weal, whatever may have been said against him by the pamphleteers of his time, who had created the port of Ostium and brought to Rome the waters which still bear his name, employed 30,000 slaves during eleven years to bore in the mountain an outlet by which the neighboring villages might be saved from those periodical inundations by which they were ruined. It was a big thing in the days of Claudius, and Suetonius has described the festivals by which its achievement was celebrated. But the successors of Claudius were careless, and with the decline and fall of the Roman Empire, the Lake of Fucino recommenced its devastations, which lasted 1,800 years, until a private individual accomplished what Cæsar dared not attempt and Claudius failed to do durably. At present the Lago di Colano, of which the surface area exceeds 34,000 acres, is entirely dried up, and on its site stand 400 farms, all bearing the escutcheon of the Torlonia. The completion of this gigantic enterprise assures to Prince Alessandro a place among the benefactors of his country, and it is entirely personal. In the beginning he allowed every one to believe that he was acting for a joint-stock company, modestly admitting that no one private individual could be wealthy enough or bold enough to take in hand a task so costly and so uncertain. But the truth soon leaked out, and the world soon learned that all the scrip of that pretended company belonged to the Roman banker. Perhaps you will admit that the Lake Fucino

enterprise is a good set-off to the story of the mirrors of Prince Giovanni, Stendhal's bug-bear.

This clever, lucky man died at the age of eighty-six, leaving no direct heir to his name, and this was the one black speck upon his sun. His wife, a Colonna of the elder branch, bore him two daughters, losing her reason and her life at the birth of her second child, who survived her mother only a very short time. He sought to marry the other to some one who would assume and perpetuate the patronymic of which he was so justly proud, but Giulio Borghese came forward as a suitor, and as he pleased the girl the old man yielded a reluctant consent. The Borghese are the Cobourgs of Italy. Their personal attraction and the dignity of their life, their palaces, their name so deservedly popular in Rome, make of them the predestined husbands of rich heiresses. And so it was that the Princess Anna Maria de Torlonia became the spouse of Don Giulio Borghese, Duca di Cori, and henceforward, like the Salvoili and the Aldebrandini of less high-sounding names, but of equally solid opulence, the Torlonia will become Borghesi.

Of all his gala equipages in the latter years of his life Prince Alessandro retained only the old-fashioned vehicle, with its old-fashioned lackeys, with its silver-gilt harness with gold everywhere that it could be stuck on, and, of course, with its inevitable coat-of-arms. In this antiquated coach were carted about the guests particularly recommended to him to whom he wished to do especial honor, and, as far as it could be perceived, men, women, and children began to bow and scrape, and sometimes to cross themselves devoutly, answering simply to the inquisitive stranger: "È la carozza del Principe Torlonia," but never telling how the Prince himself had not taken his seat within it for fifteen years, putting it at the orders of the Bambino of the church of Ara Cœli, who, although he still continues his traditional visits to women in childbirth, has reformed his equipages since 1870. The Bambino yet wears his diamond-embroidered swaddling clothes, but he relies upon his devotees for a lift when on the way to pay a morning call. — *C. J., in the New York Times.*

CO-OPERATIVE WORKSHOPS IN FRANCE.

TOMB OF MARSHAL SAXE
IN THE CHURCH OF ST. THOMAS, STRASBOURG.

A GOOD deal of attention has been given by political economists to the experiment in co-operation which was attempted in 1838 by M. Leclaire, a house-painter in Paris, having about two hundred men in his employment. Even in the first year his success was remarkable, and although he relinquished a large part of his profits, M. Leclaire was able, after a time, to acquire a handsome competency. John Stuart Mill says that M. Leclaire set a beneficent example, which found imitators among large employers in Paris. The latest of the Foreign Office Reports, says the *Architect*, is devoted to the subject of co-operation as it is practised on the Continent and in America. Mr. Egerton, of the Paris Embassy, gives an account of the present state of the Maison Leclaire. The system has been altered since 1865, when Stuart Mill last described the establishment. At that time there were three partners; viz., M. Leclaire and M. Defournaux, who each received 240*l.* a year for superintendence, and a Provident Society, made up of all the employés, represented the third partner. Each partner had invested 100,000 francs, but the employés received one-half the profits, although owning no more than a third of the capital. It was agreed that on the retirement of the private partners the whole of the goodwill and plant should become the property of the Provident Society. At present the employés appear to have the entire control of the Maison Leclaire, but another title has been substituted, for the establishment now is known as Redouly & Cie. The French of late appear to have a passion for obliterating names that were likely to be interesting.

The following is Mr. Egerton's report: —

M. Leclaire, originally a working painter, having started a workshop, determined not only to interest his workmen in the profits, but by degrees to educate them to be able to take in hand his whole business. His aim was that they should advance by practical proof given of their individual capacities.

He began in 1838 by a mutual-benefit society (Société de Sécours Mutuel), to which he made-over twenty-five per cent of the net profits. This fund was not only for aid in case of illness and for pensions, but was intended to produce a capital to be employed in the business itself.

Every workman invalided was given from this fund (unless his illness were caused by drunken habits or vice) 2 frs. 50 c. a day; this was increased to 5 frs. after 1881. The pensions were fixed at from 500 frs. to 1,000 frs., and were always granted in cases of accidents or serious chronic illness, or after twenty years of service to those over fifty. This pension was increased after 1881 to 50*l.* Half of the pension reverted to the widows or orphans. Thus in 1877 36,450 frs. were paid to twenty-four old members and eleven widows, and these pensions rose in 1881 to 46,800 frs., thirty-four pensions to members and ten to widows and orphans. In case of a workman leaving the house before he is entitled to pension he receives 20 frs., the amount of his subscription to the benefit fund, and 10 frs. for each year of active service. This last sum is increased to 20 frs. for the widows of members who have died in active employment. Notwithstanding these heavy charges, the fund possessed in 1877 a capital of 906,000 frs., which in 1883 had grown to 1,412,224 frs.

The co-operative part of the business itself is thus organized: —

Free or temporary workmen. Candidates for the nucleus ("*noyau.*")

The "*noyau*" comprises the associated workmen and employés.

The "*noyau*" and the candidates for the "*noyau*" form about a quarter of the total number employed, say about one hundred and twenty of the "*noyau*" and about one hundred candidates. Beyond five years of service in the house, there is no condition but good work, conduct, and capacity for admission to the "*noyau.*" The members of the "*noyau*" itself elect by simple majority of votes, after previous examination, and report those whom they judge fit to belong to it.

The members of the "*noyau*" have the following privileges: —

If the general council approve, they receive 25 c. per day in excess of the salaries given for similar labor by the City of Paris. This addition to their pay is not given at once, but at the end of the year. They name the members of the "committee of conciliation," which is charged with the order and inspection of the business, with giving advice, and with inflicting the prescribed penalties. They name the overseers, the new members of the "*noyau,*" and the two delegates, who have to examine, in concert with the president of the benefit society, the balance-sheet; and they have to see that the division of profits has been made in conformity with the statutes. (Publicity is necessary in all "sociétés anonymes.") They are entitled to the pensions above mentioned.

The two members who manage the house and represent it are chosen from and elected by the "*noyau.*" These managers of the business receive 6,000 frs. yearly, and 25 per cent of the net profits. The senior manager receives two-thirds of this, the junior a third. Beyond this the managers have no personal vested right in the house, and in case of death or leaving the house are simply replaced by election. The president of the benefit society may even move that they be replaced. Each of these two managers must be interested in the house to the amount of 100,000 frs.; but in order that the want of this capital may not be an obstacle, this amount may be formed by the accumulation of two-thirds of the profits due each year to the newly-named manager, and the manager who is replaced can only withdraw his share in proportion as that of his successor is made good.

The remainder of the common working capital, say 200,000 frs., is given as a deposit by the benefit fund. The house is, in fact, the property of the picked body of workmen which constitutes the "*noyau.*"

Twenty-five per cent of the profit goes, as I have said, to the managers, 25 per cent to the benefit fund, and the remaining 50 per cent is divided amongst the workmen and employés of the house, *pro ratâ* of their salaries. Practically, therefore, the workmen and employés are thus paid over 75 per cent of the net profits.

The proportion of the profits to the salaries grew gradually to 12, 14 and 16 per cent up to 1877, and in 1884 it reached 20 per cent, when the amount was 322,500 frs.; in 1882 the profits were 22½ per cent more than the total amount paid for salaries.

The "*noyau*" does not of course directly interfere in the general direction and daily management, which is in the hands of the two managers.

It is interesting to see the use made of their profits by the workmen. In the year 1877, out of 135 workmen 63 put their shares of profit in the benefit and savings funds, or in shares — capital invested in the house receives 5 per cent a first charge, but does not participate in the profits; 17 spent them on their families, 16 paid debts made during want of employment or illness, seven put them into small shops kept by their wives or children, and 1 paid the money he still owed for exemption from military service. This is demonstration of the saving tendencies of the workmen.

In the Commission of 1883 it was stated in evidence that 3,326,142 frs. had been distributed amongst those employed by this house, as shares of profits or bonus from 1842 to 1882.

The element of success was, according to the evidence, the formation of the picked intelligent body of workmen called the "*noyau.*" The idea of equality of pay would, it is said, be looked on by them as ridiculous. They had been at one time rather hampered by

agitators, but the men had soon the sense to see where their true interests lay, and broke with them.

Co-operation under a different arrangement exists since 1877 in the large manufactory of kitchen and heating apparatus at Guise, founded by M. Godin. It is known as the "Familistère" — a word that was probably derived from the "Phalanstère" of Fourier. In 1883 there were about nine hundred directly interested in the business of the establishment.

According to Mr. Egerton, the workmen are paid according to their capabilities, after free discussion before a council of their fellows.

The division, too, of profits is made on a graduated scale. Thus a first-class member (*associé*) — picked workmen of long service, of whom in 1883 there were seventy—receives twice as much; the second class (*sociétaire*) half as much again individually (there are one hundred such) as the "*participants*" or third-class members (of whom there were eight hundred).

M. Godin has found great advantage in this division of profits. The work has much improved, the hands much more careful to guard against mistakes, and that the interest taken in the business by the hands has much increased is shown by the constant new inventions and improvements made by the men. Since they were made partners, a great number of patents have been taken out by the "Familistère."

All the workmen have a portion of their pay and profits re-invested in the house, and by this system M. Godin the original founder of the business, is being gradually bought out of it, and he means that this system shall continue. It is more generally beneficial, he considers, that the buying out in rotation shall continue indefinitely, so that those who have long profited by the great advantages of the institution — and have in fact enriched themselves — should in time give way to the young and poor who are beginning. Naturally, of course, this process is slow, as the capital of the business is increasing.

M. Godin practically keeps a certain management of the business in his own hands, though theoretically the business is managed by three councils or boards, viz., the board of management which meets monthly, the business council which is held every week, and the council for the management of the buildings and the commercial business.

Enormous buildings have been constructed by the association, so as to lodge the hands and their families. Some of the members, more especially the second class or "*sociétaires*," are bound to live in these houses.

M. Godin, in his evidence before the Commission of 1883, gave very full details of the working of this remarkable and useful establishment, which is a complete partnership and co-operation of capital and labor. A branch of this "Familistère" has been founded near Brussels, and is successful.

The evidence given to the Commission of 1883 shows immense variety in the details of the systems adopted by the various co-operative societies, and by those firms where the profits are shared by the workmen; but all managers of houses, and those who have practical experience were agreed that the system of co-operation and of sharing profits puts an end to strikes and improves production and good relations. Some associations, as that of the opticians, even took active part with the employers of labor in opposing a strike.

There has been no case of disposition to strike for increased share of profits. M. Roberts, an important witness, scouts the idea of this as a future danger.

The objection of some heads of houses to their workmen sharing profits seems to proceed mainly from dread of the extra trouble of management and account-keeping entailed thereby.

Co-operative workmen, and those working for a share of profits, rarely ask for a Monday holiday, as do most other workmen; thus their houses are able to execute orders with greater rapidity. When there was a strike among the painters, the co-operative workmen at M. Leclaire's worked fourteen, and even more, hours per day without the slightest complaint.

SOCIETIES

THE T-SQUARE CLUB OF PHILADELPHIA.

AT the regular meeting of the T-Square Club of Philadelphia, held December 1st, the prizes were awarded as follows: 1st, Walter Cope; 2d, L. C. Hickman; 3d, Arthur Truscott.

The programme was: a stable with accommodations for four horses and a cow.

Fifteen designs were submitted, the average merit being high.

ART STUDENTS' LEAGUE, NEW YORK.

Professor Russell Sturges kindly gave the members and students of the Art Students' League an interesting talk on bronzes on Saturday evening the 4th. The period covered being from the early Greek discoveries down to the later Renaissances. The lecture being illustrated by stereoptican views and the Professor's complete collection of photographs.

COMMUNICATIONS

THE CASE OF MR. BALDWIN AND THE A. I. A.

Baltimore, December 7, 1886.

To the Editors of the American Architect: —

Dear Sirs, — Appreciating your refined sense of justice and sound judgment I venture to ask of you and the members of the profession who were not present at the recent convention of the A. I. A., held in New York last week, a suspension of judgment upon the, *if truly reported*, unjust and hasty judgment passed by the Convention upon me on charges preferred by a fellow member, until I have had the opportunity to disprove the acts which I scorn as I do the man who accuses me of them, and oblige, Yours respectfully,

E. F. Baldwin.

Baltimore, December 7, 1886.

To the Editors of the American Architect: —

Dear Sirs, — The enclosed letter, published in this morning's paper, explains itself.

December 6, 1886.

Editor American: —The report, as appearing in your issue of Saturday and Sunday, in regard to the Action of the American Institute of Architects, in session at New York, asking for the resignation of Mr. E. F. Baldwin, for "unprofessional practice," caused the utmost surprise and indignation to us and others of Mr. Baldwin's professional associates in this city. No official information of such action of the Institute has yet been received by Mr. Baldwin, and nothing is known of it here beyond what has appeared in the newspapers, as Mr. Frederick was the only Baltimore architect present at the time of the proceedings. The facts of the case between Mr. Baldwin and Mr. Frederick can easily be ascertained, we presume, from the evidence submitted to the Board of Trustees; but that such precipitate action should be taken by the Institute in regard to a member of such high standing as Mr. Baldwin, both as an architect and a man, without an opportunity for explanation or defence, and actually without his knowledge — on what might presumably be considered an *ex parte* representation — seems to us to call for decided protest, and a request to the public to suspend their judgment till the facts are better known. Very respectfully,

Wyatt & Sperry.

It is merely a public expression of our feeling in the matter, pending any more official action that the Baltimore Chapter may take later. Our opinion is shared by many others.

Yours respectfully, Wyatt & Sperry.

THE BOSTON STATE-HOUSE QUESTION.

Boston, Mass., December 9, 1886.

To the Editors of the American Architect: —

Dear Sirs, — I owe you one for a shy at our lovely home to which I am deeply attached. If the editor had looked at the ground behind the State House he would have seen that the "large vacant lot" is *not* "some distance beyond" the row of houses in the rear, nor is it "separated from it by other streets." But that houses and vacant lot are *one* solid lot, bounded by Mt. Vernon, Temple, Derne and Hancock Streets, separated by one narrow street from the State House, and could, without difficulty be joined to the present State House. If a particular editor objects to bridges — the street could be closed and passage deflected at Joy, instead of as now at Mt. Vernon (right angle). But the Paris public finds no objection to both foot and horse and 'bus ways through and under the Louvre, and I don't see why other cities should to similar passages.

Yours truly, Chas. G. Loring.

THE NASHVILLE M. E. CHURCH COMPETITION.

Nashville, Tenn., December 10, 1886.

To the Editors of the American Architect: —

Dear Sirs, — Referring to the competition for designs for the new West End M. E. Church, South, at Nashville, Tenn., I am this morning authoritatively informed that at a meeting of the Board of Trustees, last evening, action was taken reducing the amount of the prize for the design selected from $500 to $200. As I was responsible for the sending of the printed circular to you, I deem it my duty to inform you of this change.

Very respectfully yours, Olin H. Landreth.

BOOKS ON MILL CONSTRUCTION.

Philadelphia, December 11, 1886.

To the Editors of the American Architect: —

Dear Sirs, — Would you kindly inform me what are the best works on modern mill construction, more especially those referring to the system of slow-burning construction, the use of automatic-sprinkling apparatus, and systems of ventilation for mill buildings?

Yours respectfully, B.

[B. H. Thwaite's "*Our Factories, Workshops and Warehouses:* their sanitary and fire-resisting arrangements," published in 1882, by E. & F. N. Spon. Price, $3.50. C. J. H. Woodbury's "*Fire Protection of Mills and Construction of Mill Floors:* tests of full-size wood mill columns," published by John Wiley & Son, in 1882. Price, $2.50. — Eds. American Architect.]

A BOYCOTT AGAINST THE *AMERICAN ARCHITECT.*

A CORRESPONDENT at Coldwater, Mich., sends us the following newspaper clipping and asks whether the Knights of Labor have declared a boycott against the *American Architect*. The only thing in the petition that really surprises us is that the L. A. 4571 did not include in its petition a request that the $2.40 thus, for the moment, saved to the city should be paid in to the treasury of that honorable body.

"The following resolution was passed by the K. of L. Thursday evening, December 9:

"Resolved, By L. A. 4571, that we urge upon the City Library Board the propriety of discontinuing the *American Architect and Building News*, which merely gratifies the eyes of a few people, and use the money thus saved in subscribing for four labor papers to be kept on file at the Public Library; we recommending John Swinton's Paper, New York, at $1 a year; The *Industrial News*, Toledo, O., at 60 cents a year; The *Chicago Express*, at $1 a year, and the *Chicago Knights of Labor*, at $1 a year."

NOTES AND CLIPPINGS

FIRE-EXTINGUISHING POWDERS. — A German physicist directs attention to a method of extinguishing fires which was first brought to public notice several years ago. He recommends for closed places, where the use of water or other liquids would be likely to do great damage, a dry compound which, by its burning, absorbs the oxygen and quickly renders combustion impossible. The compound is composed of powdered nitrate of potash (saltpetre), 59 parts; powdered sulphur, 36 parts; powdered charcoal, 4 parts; colcothar (brown-red oxide of iron), 1 part. This preparation is one that can be cheaply made. It is recommended that it shall be, when thoroughly dried and mixed, put up in tight pasteboard boxes holding about five pounds each, with a quick fuse in the side of the box — protruding six inches, with 4 inches inside — to facilitate and insure lighting it. — *The Iron Age.*

WOMEN AS ARCHITECTS. — Mr. C. Harrison Townsend writes to the *Pall Mall Gazette* of October 28 as follows: —

It has of late been largely agreed that there are many fields of work, hitherto complacently occupied by men only, which there is every reason to suppose could be as worthily filled by women. In making fresh suggestions in this sense I would say that my remarks have more direct reference to the girl and the young woman of the middle class than to those of the artisan class. What really valid objection is there to asking her to become a "draughtswoman," and in due course an architect? Surely, an occupation such as the preparation of architectural drawings, requiring neatness and delicacy of touch, attention to detail, patience, and care, is one which would seem at first blush more likely to find its proficients among women than men. Let us, then, look into the course of training that prevails, and see if it offers any considerable bar to the adoption by women of architecture as a profession In brief, the routine is as follows: A youth on leaving school — with an aptitude, more or less, for the profession — is articled as pupil for four or five years to an architect to whom he pays a premium. This is, of course, in proportion to the position and repute of the architect in question, but may be stated at from a hundred pounds to four or five times that amount. As with solicitors, so among architects, the pupil is supposed, by having "the run of the office" to acquire an intimate knowledge of its work — design, draughtsmanship, knowledge of materials, official routine, and so on. If a young fellow of parts, he soon begins to "feel his legs" and to understand his work, and, if wise, supplements his office instruction by attendance at the admirable classes of the Architectural Association and elsewhere. At the end of his articles he is qualified to dub himself a "junior draughtsman," in which capacity he claims, as salary, from a pound to two pounds a week. A couple of years should then see him a draughtsman proper, and in a position to obtain three, three-and-a-half, or four guineas a week. In many cases, of course, thanks to such "backing" of his friends as he may be fortunate enough to get, the lucky pupil can set up on his own account immediately his articles are completed. In this routine which I have briefly sketched there are only two objections that stand in the way of its adoption by women. Against the first, which is the "commingling of the sexes" caused by the admission of women as part of an ordinary office staff, we can adduce American experience. Here they are frequently employed as type-writers and so on. As an illustration, I may mention that the Government clerks in Washington number about 15,000, of whom 4,000 are women, and that "it is often the case that young men and young women have desks side by side." (See *Pall Mall Gazette*, September 27.) But even should conservatism insist vigorously in this respect, we can at least compromise with it, and suggest a "women-clerks' room" as a solution of the difficulty. The second objection is the difficulty women should experience as regards the inspection of buildings and the necessary mounting of scaffolding for that purpose. While reminding the objector that women-decorators have been known to work for days on scaffolds, and that there are such things "as divided skirts," I would say that I am more particularly suggesting that women's work in an architect's office should be "drawing-board work," such as ornamental and other detail drawings, competition, sets of plans, schemes of color decoration, and perspective drawings. The simpler department of tracing has, I am told, been tried, and with some success, by the Ladies' Tracing Office in Westminster; and other ladies besides the Misses Garrett, have taken up decoration work, and a certain amount of architecture connected with it. My plea is for a further advance on the part of women into a territory of which there is no reason that man should occupy the whole.

TRADE SURVEYS

CONSIDERING the extraordinary industrial activity of the past four months, it is not to be wondered at that so much capital should be now seeking employment in the multifarious reproductive channels. At the same time that our own industries are preparing for a genera' advance, we learn that the industries of Great Britain and of Europe are emerging from a more or less general depression in which prices declined to cost, and much capital was, for a long time, rendered unproductive. The advance on both sides of the water at the same time is an accident. The conditions surrounding and underlying the trade and industries of both countries are dissimilar in many respects; in some few features they are like. The question of the permanency of the general upward tendency concerns us most. The strength of the British and European situation lies in the extending and expanding colonial requirements. The strength of the American situation lies in the extension of our railway system. This improvement derives strength from a variety of sources, but its strongest foundation, apart from the fact of heavy railroad construction, is in the diversification of our industries.

Such frequent notice has been made of the flow of industrial capital into the South that it has become an old story. It should not be so because the outflow or inflow has assumed the proportions of nothing but a rivulet compared to what it will be during the next ten years. The Southern people are only beginning to understand the real and enormous value of their inheritance. Northern and foreign capital is picking up the most eligible sites, the most valuable tracts, and is taking possession of the most desirable lines for transportation. It matters not, of course, from whence comes the capital or the men which bring about these great social and industrial changes. The fact that this movement is of greater importance than the bulk of newspaper readers are accustomed to regard it is the point to which attention is directed. It may sound like a prediction, but it is based upon facts, to say that the opportunities for the investment of capital during the next four years will be out of all comparison to the opportunities that have heretofore existed. These opportunities will not be confined to our own country or continent, but will be presented throughout the civilized world, and will be mainly directed to the more liberal provision of facilities for cheap and ready intercourse. The general condition of industries throughout the world is improving. Great Britain is rising out of a depression which vexed the oldest heads of trade and commerce. France and Germany have been expanding their productive capacity and leaving their old competitor behind in several markets of the world. American nick-nacks and ironmongery have been leading British products in Europe. That this complaint will grow in weight must be apparent to any one who is familiar with the wonderful development of the smaller industries in this country, and particularly those connected with the hardware, iron, implement and tool trades. Little industries are springing up in these branches where taxes, labor and power are cheap, and where the increasing efficiency of machinery smile at the dictation of trades-unionism. Our railway mileage, so far this year, foots up 7,000 miles against 2,700 up to same time last year. The side tracks and repairing requirements will amount to about forty or fifty per cent of this total, increasing it to that extent. The reported railway earnings are acting as a stimulant to railway enterprises to be undertaken during the coming year. The new syndicates were formed a few days ago in New York looking to the inauguration of railway construction enterprises intended more to develop territory in the Southern States than to construct long lines or trans-continental lines. The new investments will be directed to the development of agricultural, mineral and timber resources. The pig-iron production is a little over 123,000 tons per week. Prices have been advanced to $20 and $19 for foundry irons and to $17 to $18 for forge irons. Steel rails have been advanced to $36 at mill and old rails to $25 at tide water. English steel rail-blooms are $4 higher than they were four months ago, and all kinds of iron and steel material, excepting nails, have reached an advance which they will hold. Nails are weak and a proposition was made a few days ago to restrict production between now and March 1. The Eastern and Western nail-makers will probably meet shortly in New York or Philadelphia to agree upon a restriction of output. The lumber trade will hold the firm prices that have been reached, but the expectations of some of the sanguine dealers both East and West are doomed to disappointment because of the heavy supplies that the industrial activity of the past few months has stimulated. There is throughout all the country a strong desire to take advantage of the coming heavy demand and good prices. The textile-goods manufacturers feel in but little danger of overdoing the market, and it is given out that they will begin work full time throughout the New England States in January. The hardware manufacturers feel similarly encouraged, and a note should be made of the fact that in spite of the very heavy importations of foreign hardware and cutlery, American enterprise has increased factory capacity, and expects to come in successful competition with many of the lines of goods that have been controlling our market during recent years. The coal producers have increased their facilities at least ten per cent this year, according to safe authority, by the opening of mines along the lines of several railroads in the West and South. The latest opinions expressed by the leading architects East and West confirm the opinions all along expressed as to the active character of winter work looked for. Builders have made liberal contracts for material and the manufacture of small machinery and motive power have increased their orders since the 1st of December. There is very little uncertainty as to the character of next year's building operations. An immense amount of house and shop capacity will be wanted, and it will be supplied with more confidence than it was supplied this year. Building material will be, if anything, cheaper next year. The lumber dealers would be glad to put up prices, but in this they will fail. The coal-producers would be glad to combine prices up ten per cent, but while there are probabilities of this the risks overbalance. The producers of all kinds of shop and factory goods are living in the hope that spring prices will enable them to accumulate wider margins than they did this year. Three months ago there were probabilities that such would be the case. Since then the tide has turned. Too many wheels have been set turning. The increase in steam capacity has been beyond all precedence, and consumers in every channel of activity can rest assured that the period of high prices will be of very short duration. Production will be crowded in every industrial channel. It is possible that for a while higher prices will be held in steel, iron and for certain lines of well-protected goods, protected both by duties and by patents, but taking the general production of the country the increase in output will save it from higher prices than can be safely maintained.

The American Architect and Building News for 1887.

A PRELIMINARY PROSPECTUS.

It is not desirable for a journal which tries to place before its subscribers fresh and seasonable reading-matter to present a too-complete syllabus of the discourses which the editors propose to bring before them during the coming year, therefore, we will say only that we have in preparation the following series of valuable papers:—

"**Building Accidents.**" a series of papers treating of every class of accident, that may befall a building, each class being considered by that writer whose opinion on the subject we consider likely to be most valuable. As our arrangements are not yet perfected we are unwilling to publish the, at present, incomplete list of contributors.

"**How the Conventional House may be made Picturesque.**" a series of illustrated papers by Mr. H. Edwards-Ficken, architect. Those who are familiar with this gentleman's decorative work and with the facility with which he can interpret in line his ingenious conceptions will understand that these papers will have more than a "popular" value.

"**Elevators: the Features common to all Makes and their Relation to Planning and Construction,**" a series of illustrated papers by an expert.

"**Hints to Builders,**" a series of practical papers on construction addressed to students by W. H. Brown, author of the "*Arch, Vault and Dome*," "*History and Principles of Decorative Art*," "*Buhl Work*," etc.

"**The Water-supply of Buildings,**" an illustrated series of articles by John Pickering Putnam, architect. The publication of this series, which was included in the programme for last year, we have found it desirable to postpone until now.

Fine Art Exhibitions. Mrs. Schuyler Van Rensselaer will, as she has done during the past ten years, keep our readers informed as to what artists and amateurs of art find of most interest in the galleries and elsewhere. Amongst the earliest papers from her pen will be some notes on the "**Works of Augustus St. Gaudens, sculptor.**"

Other articles on the "**History of Decoration,**" on "**Cement and Iron in Construction,**" on "**Railroad Stations,**" etc., are also in preparation.

The following series of papers, the value of which has been shown by the portions already published will be continued through the greater part of the year:—

"**Architect, Builder and Owner before the Law,**" by T. M. Clark, architect.

"**Safe Building,**" by Louis De Coppet Berg, architect.

"**Early Settler Memorials,**" by Truman H. Bartlett, sculptor.

"**Ancient and Modern Light-houses,**" by Major D. P. Heap, Secretary of the U. S. Light-house Board.

The manner in which topics of current interest will be treated should be too well-known by this time to require description.

ILLUSTRATIONS.

Gelatine Prints.— The number, quality and character of these attractive plates will not fall below the standard of those already issued.

Rotch Travelling Student Sketches.—The mass of these sketches in our hands shows that these plates — which add so greatly to the value of the Imperial edition — will be no less interesting in the future than they have been in the past.

Old Colonial Work.— Measured drawings of Old Colonial work in Virginia and Maryland will be furnished, with descriptive text, by Mr. Glenn Brown, architect.

Etchings.— The photo-lithgraphic reproduction of choice architectural etchings will be continued at regular intervals.

Photo-Caustic reproductions of foreign architectural subjects will receive rather more attention than during 1886.

Contributed Illustrations will be as varied and interesting as circumstances permit.